MICROSCAN

MicroHAWK ID-40/MV-40

Connectivity for MicroHAWK ID-40/MV-40 and Siemens Totally Integrated Automation (TIA) Portal v13 SP1 Update 8

Version 1.0
8/1/2016

1 Contents

1 Introduction

This guide explains how to setup the Microscan MicroHAWK Auto-ID product with the Siemens TIA Portal. All files required for setup can be found on your MicroHAWK unit in the Microscan Connectivity under ProfiNET. The files are also downloadable by going to 2D Barcode Readers and clicking the GSD icon in the MicroHAWK Barcode Readers at: http://www.microscan.com/en-us/ServiceAndSupport/DownloadCenter.aspx

2 Protocol Switching in ESP and Weblink

This section describes how to enable ProfiNET in ESP and Weblink.

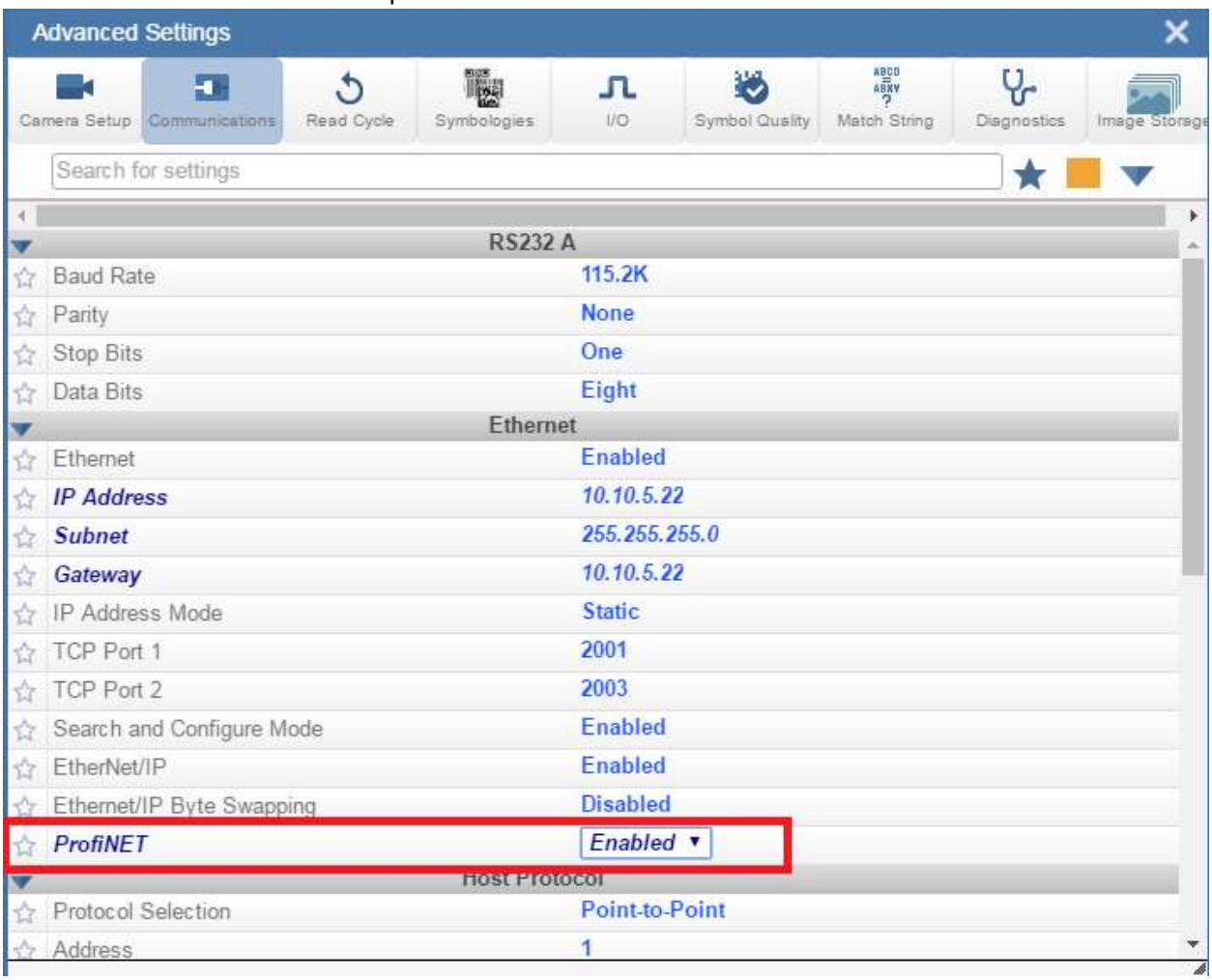
2.1 ESP

Go to the communications tab in ESP and under Ethernet there will be a node called ProfiNET. To the right click the dropdown box and select **Enabled**.

2.2 Weblink

Go to the Application settings icon  in the upper right hand corner and select the Advanced settings icon 

. In advanced settings select the communications tab under the Ethernet sections select Enabled in the dropdown box.



3 Using ProfiNET

This section provides information necessary for using the MicroHAWK in a ProfiNET environment.

Note:

- The unit's communication protocol must be enabled and set to ProfiNET enabled for the unit to begin using the ProfiNET protocol. Please follow the steps in Chapter 2 Using Protocol Switching in ESP and Weblink.

3.1 Overview

The ProfiNET interface will be identified as an Ident Systems. The interface will transmit data through RT Cyclic Messaging

3.2 Necessary Tools

The following tools are helpful for configuring/debugging ProfiNET I/O

- ProfiNET Messaging Tool – can be a PLC or Software Tool, must be capable of sending/receiving RT Cyclic Messages.
- Terminal emulation or serial communication tool that can connect to a TCP socket, such as HyperTerminal.
- ESP – Microscan's Easy Setup Program. This tool has the ability to find Microscan products on the network, configure their IP address, then configure all application parameters.

3.3 Device Identity

The MicroHAWK ProfiNET device identity is the following:

3.3.1 Vendor ID

Microscan's Vendor ID is 0x0257

3.3.2 Device ID

The Device ID for the MicroHAWK is 0x3410

3.3.3 Vendor Name

The vendor name is MICROSCAN

3.3.4 Device Function

The device function is:
MainFamily = Ident Systems
ProductFamily = MicroHAWK

3.4 MicroHAWK ProfiNET Object Model

The MicroHAWK uses Real Time (RT) Cyclic messaging to communicate run time data to one Input and one Output data slot. The programmer can choose from one of the six input data blocks, and one of two output data blocks, to use in their program. These data blocks are explained in Section 3.5

3.5 Input Modules

This section will go over all the input modules for the MicroHAWK. Only one input module is allowed and each input module varies in size to allow flexibility between controllers. Please not the input module must be paired with the correct output module to function properly.

3.5.1 Input Small Legacy (MicroHAWK→PLC)

This is a small, lightweight input data block. Designed to hold 64 bytes of information in the decode data string with minimal read cycle and device data. Below is a table showing the memory allocation for the data block

***NOTE: This input block must be paired with the Output Legacy to function correctly. ***

3.5.1.1 Input Small Legacy Table

SHORT DESCRIPTION	SIZE (BYTES)
USER-DEFINED TAG ECHO	4
COMMAND ECHO	4
OUTPUT CONTROL ECHO	4
READ CYCLE SEQUENCE COUNTER	4
DECODE DATA LENGTH	4
DECODE DATA STRING	64

Total Size: 84 Bytes

3.5.1.2 Input Small Legacy Description

This section will describe the members for Input Small Legacy data block.

3.5.1.2.1 User-Defined Tag Echo

These are a direct echo of the equivalent fields in the Output Legacy data block. They provide the PLC programmer with a method of verifying that the OUT data has been received by the MicroHAWK or any method the programmer wishes to use these 4 bytes of data.

3.5.1.2.2 Command Echo

These are a direct echo of the equivalent fields in the command field located in Output Legacy data block. This provides the PLC programmer with a method of verifying that the command data has been acknowledged by the MicroHAWK.

3.5.1.2.3 Output Control Status

Provides the PLC programmer with the current status of the external physical outputs for the MicroHAWK.

3.5.1.2.4 Read Cycle Sequence Counter

When this value changes, it indicates a new read cycle report is present. Read cycle report data is only valid when Sequence is not 0. Read cycle reports are only output during normal read cycles: continuous, serial, and triggered. Read cycle reports are not output during bar code configuration, read rate, auto-calibration, or ESP "Setup" mode.

3.5.1.2.5 Decode Length

The number of characters found in the decode string

3.5.1.2.6 Decode Data

Outputted decode data from the unit with one difference. Preamble and post amble symbols are not added.

3.5.1.3 Input Small Legacy Member Location

The following table displays the location of the members for the Input Small Legacy data block.

3.5.1.3.1 Member Map Table

	Member	MH_	Target	BitNumber	Data Length	Byte Offset
	User Defined Tag Echo	**Unsigned 32**			**4 Bytes**	**0**
32 Bit Boundary	UserTag_1	Boolean	User Defined Tag	0	1 Bit	
	UserTag_2	Boolean	User Defined Tag	1	1 Bit	
	UserTag_3	Boolean	User Defined Tag	2	1 Bit	
	UserTag_4	Boolean	User Defined Tag	3	1 Bit	
	UserTag_5	Boolean	User Defined Tag	4	1 Bit	
	UserTag_6	Boolean	User Defined Tag	5	1 Bit	
	UserTag_7	Boolean	User Defined Tag	6	1 Bit	
	UserTag_8	Boolean	User Defined Tag	7	1 Bit	
	UserTag_9	Boolean	User Defined Tag	8	1 Bit	
	UserTag_10	Boolean	User Defined Tag	9	1 Bit	
	UserTag_11	Boolean	User Defined Tag	10	1 Bit	
	UserTag_12	Boolean	User Defined Tag	11	1 Bit	
	UserTag_13	Boolean	User Defined Tag	12	1 Bit	
	UserTag_14	Boolean	User Defined Tag	13	1 Bit	
	UserTag_15	Boolean	User Defined Tag	14	1 Bit	
	UserTag_16	Boolean	User Defined Tag	15	1 Bit	
	UserTag_17	Boolean	User Defined Tag	16	1 Bit	
	UserTag_18	Boolean	User Defined Tag	17	1 Bit	
	UserTag_19	Boolean	User Defined Tag	18	1 Bit	
	UserTag_20	Boolean	User Defined Tag	19	1 Bit	
	UserTag_21	Boolean	User Defined Tag	20	1 Bit	
	UserTag_22	Boolean	User Defined Tag	21	1 Bit	
	UserTag_23	Boolean	User Defined Tag	22	1 Bit	

	UserTag_24	Boolean	User Defined Tag	23	1 Bit	
	UserTag_25	Boolean	User Defined Tag	24	1 Bit	
	UserTag_26	Boolean	User Defined Tag	25	1 Bit	
	UserTag_27	Boolean	User Defined Tag	26	1 Bit	
	UserTag_28	Boolean	User Defined Tag	27	1 Bit	
	UserTag_29	Boolean	User Defined Tag	28	1 Bit	
	UserTag_30	Boolean	User Defined Tag	29	1 Bit	
	UserTag_31	Boolean	User Defined Tag	30	1 Bit	
	UserTag_32	Boolean	User Defined Tag	31	1 Bit	
	Command Echo	**Unsigned 32**			**4 Bytes**	**4**
32 Bit Boundary	Trigger_Echo	Boolean	Command Echo	0	1 Bit	
	New Master Echo	Boolean	Command Echo	1	1 Bit	
	Reserved for future use	Boolean	Command Echo	2 - 7	6 Bits	
	Disable Scanning Echo	Boolean	Command Echo	8	1 Bit	
	Reserved for future use	Boolean	Command Echo	9 - 15	7 Bits	
	Clear Read Cycle Report and Counters Echo	Boolean	Command Echo	16	1 Bit	
	Unlatch Outputs Echo	Boolean	Command Echo	17	1 Bit	
	Reserved for future use	Boolean	Command Echo	18 - 31	14 Bits	
	Output Control Echo	**Unsigned 32**			**4 Bytes**	**8**
32 Bit Boundary	Out1 Echo	Boolean	External Output	0	1 Bit	
	Out2 Echo	Boolean	External Output	1	1 Bit	
	Out3 Echo	Boolean	External Output	2	1 Bit	
	Reserved for future use	Boolean	External Output	3 - 31	29 Bits	
32 Bit Boundary	**Read Cycle Sequence count**	**Unsigned 32**	**Read Cycle Count**	**0-31**	**4 Bytes**	**12**
32 Bit Boundary	**Decode Data Length**	**Unsigned 32**	**Decode Data Length**	**0 - 31**	**4 Bytes**	**16**
32 Bit Boundary	**DecodeData**	**VisibleString**		**0 - 512**	**64 Bytes**	**20**

3.5.2 Input Big Legacy (MicroHAWK→PLC)

The Input Big Legacy data block contains more device status information, some additional read cycle information and a longer bar code string capable of holding up to 128 bytes of information. Below is the table of the Input 128 Decode String data block and its members.

***NOTE: This input block must be paired with the Output Legacy to function correctly. ***

3.5.2.1 Input Big Legacy Table

SHORT DESCRIPTION	SIZE (BYTES)
USER-DEFINED TAG ECHO	4
COMMAND ECHO	4
OUTPUT CONTROL ECHO	4
EXTERNAL INPUT STATUS	4
EXTERNAL OUTPUT STATUS	4
DEVICE STATUS	4
READ CYCLE SEQUENCE COUNTER	4
TRIGGER COUNT	4
DECODE/MATCH COUNT	4
MISMATCH COUNT	4
NOREAD COUNT	4
DECODE DATA LENGTH	4
DECODE DATA STRING	128

Total Size: 176 Bytes

3.5.2.2 Input Big Legacy Description

This section will describe the members for Input Big Legacy data block.

3.5.2.2.1 User-Defined Tag Echo

These are a direct echo of the equivalent fields in the Output Legacy data block. They provide the PLC programmer with a method of verifying that the OUT data has been received by the MicroHAWK or any method the programmer wishes to use these 4 bytes of data.

3.5.2.2.2 Command Echo

These are a direct echo of the equivalent fields in the command field located in Output Legacy data block. This provides the PLC programmer with a method of verifying that the command data has been acknowledged by the MicroHAWK.

3.5.2.2.3 Output Control Echo

Provides the PLC programmer with the current status of the external physical outputs for the MicroHAWK.

3.5.2.2.4 External Input Status

The current status of the physical input pins on the unit

3.5.2.2.4.1 External Input Status Bit Field

BIT	PIN NAME
0	Trigger
1	New Master
2-31	Reserved for future use

0 = No current sensed on input

1 = Current sensed on input

3.5.2.2.5 External Output Status

The current status of the physical output pins on the unit

BIT	PIN NAME
0	Output 1
1	Output 2
2	Output 3
3-31	Reserved for future use

0 = Output contact is open

1 = Output contact is closed

3.5.2.2.6 Device Status

Provides the current status of the unit. Below is the bit field table that defines each bit and the relationship to the unit's status

BIT	PIN NAME
0	Reserved
1	New Master Requested
2-7	Reserved for future use
8	Scanning Disabled
9-15	Reserved for future use
16	In read cycle
17	Actively Scanning

3.5.2.2.7 Read Cycle Sequence Counter

When this value changes, it indicates a new read cycle report is present. Read cycle report data is only valid when Sequence is not 0. Read cycle reports are only output during normal read cycles: continuous, serial, and triggered. Read cycle reports are not output during bar code configuration, read rate, auto-calibration, or ESP "Setup" mode.

3.5.2.2.8 Trigger Counter

The message displays the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command

3.5.2.2.9 Decode/MatchCode Counter

The message displays either (1) the total number of good reads that match the master label or (2) the total number of good reads, or decodes. The count begins from the last power-on or Match Code/Good Read Counter Reset command. To count the good reads that match the master label, enable Match Code; to count good reads only, disable Match Code

3.5.2.2.10 Mismatch Counter

The message displays the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command

3.5.2.2.11 NoRead Counter

The message displays the total number of noreads that have occurred since power-on or the last Noread Counter Reset command

3.5.2.2.12 Decode Length

The number of characters found in the decode string

3.5.2.2.13 Decode Data

Outputted decode data from the unit with one difference. Preamble and post amble symbols are not added.

3.5.2.3 Input Big Legacy Member Location

The following table displays the location of the members for the Input Big Legacy data block.

3.5.2.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Data Length	Byte Offset
	User Defined Tag Echo	**Unsigned 32**			**4 Bytes**	**0**
32 Bit Boundary	UserTag_1	Boolean	User Defined Tag	0	1 Bit	
	UserTag_2	Boolean	User Defined Tag	1	1 Bit	
	UserTag_3	Boolean	User Defined Tag	2	1 Bit	
	UserTag_4	Boolean	User Defined Tag	3	1 Bit	
	UserTag_5	Boolean	User Defined Tag	4	1 Bit	
	UserTag_6	Boolean	User Defined Tag	5	1 Bit	
	UserTag_7	Boolean	User Defined Tag	6	1 Bit	
	UserTag_8	Boolean	User Defined Tag	7	1 Bit	
	UserTag_9	Boolean	User Defined Tag	8	1 Bit	
	UserTag_10	Boolean	User Defined Tag	9	1 Bit	
	UserTag_11	Boolean	User Defined Tag	10	1 Bit	
	UserTag_12	Boolean	User Defined Tag	11	1 Bit	
	UserTag_13	Boolean	User Defined Tag	12	1 Bit	
	UserTag_14	Boolean	User Defined Tag	13	1 Bit	
	UserTag_15	Boolean	User Defined Tag	14	1 Bit	
	UserTag_16	Boolean	User Defined Tag	15	1 Bit	
	UserTag_17	Boolean	User Defined Tag	16	1 Bit	
	UserTag_18	Boolean	User Defined Tag	17	1 Bit	
	UserTag_19	Boolean	User Defined Tag	18	1 Bit	
	UserTag_20	Boolean	User Defined Tag	19	1 Bit	
	UserTag_21	Boolean	User Defined Tag	20	1 Bit	

	UserTag_22	Boolean	User Defined Tag	21	1 Bit	
	UserTag_23	Boolean	User Defined Tag	22	1 Bit	
	UserTag_24	Boolean	User Defined Tag	23	1 Bit	
	UserTag_25	Boolean	User Defined Tag	24	1 Bit	
	UserTag_26	Boolean	User Defined Tag	25	1 Bit	
	UserTag_27	Boolean	User Defined Tag	26	1 Bit	
	UserTag_28	Boolean	User Defined Tag	27	1 Bit	
	UserTag_29	Boolean	User Defined Tag	28	1 Bit	
	UserTag_30	Boolean	User Defined Tag	29	1 Bit	
	UserTag_31	Boolean	User Defined Tag	30	1 Bit	
	UserTag_32	Boolean	User Defined Tag	31	1 Bit	
	Command Echo	**Unsigned 32**			**4 Bytes**	**4**
32 Bit Boundary	Trigger_Echo	Boolean	Command Echo	0	1 Bit	
	New Master Echo	Boolean	Command Echo	1	1 Bit	
	Reserved for future use	Boolean	Command Echo	2 - 7	6 Bits	
	Disable Scanning Echo	Boolean	Command Echo	8	1 Bit	
	Reserved for future use	Boolean	Command Echo	9 - 15	7 Bits	
	Clear Read Cycle Report and Counters Echo	Boolean	Command Echo	16	1 Bit	
	Unlatch Outputs Echo	Boolean	Command Echo	17	1 Bit	
	Reserved for future use	Boolean	Command Echo	18 - 31	14 Bits	
	Output Control Echo	**Unsigned 32**			**4 Bytes**	**8**
32 Bit Boundary	Out1 Echo	Boolean	External Output	0	1 Bit	
	Out2 Echo	Boolean	External Output	1	1 Bit	
	Out3 Echo	Boolean	External Output	2	1 Bit	
	Reserved for future use	Boolean	External Output	3 - 31	29 Bits	
	External Input Status (Physical Pint State)	**Unsigned 32**			**4 Bytes**	**12**
32 Bit Boundary	Trigger	Boolean	External Input Status	0	1 Bit	
	New Master	Boolean	External Input Status	1	1 Bit	
	Reserved for future use	Boolean	External Input Status	2 - 31	30 Bits	
	External Output Status (Physical Pint State)	**Unsigned 32**			**4 Bytes**	**16**
32 Bit Boundary	Out1	Boolean	External Output Status	0	1 Bit	
	Out2	Boolean	External Output Status	1	1 Bit	
	Out3	Boolean	External Output Status	2	1 Bit	
	Reserved for future use	Boolean	External Output Status	3 - 31	29 Bits	
	Device Status	**Unsigned 32**			**4 Bytes**	**20**
32 Bit Boundary	Reserved for future use	Boolean	Device Status	0	1 Bit	
	New Master Requested	Boolean	Device Status	1	1 Bit	
	Reserved for future use	Boolean	Device Status	2 - 7	6 Bits	
	Scanning Disabled	Boolean	Device Status	8	1 Bit	
	Reserved for future use	Boolean	Device Status	9 - 15	7 Bits	

	In Read Cycle	Boolean	Device Status	16	1 Bit	
	Actively Scanning	Boolean	Device Status	17	1 Bit	
	Reserved for future use	Boolean	Device Status	18 - 31	14 Bits	
32 Bit Boundary	**Read Cycle Sequence Counter**	**Unsigned 32**	**Read Cycle Sequence Counter**	**0 - 31**	**4 Bytes**	**24**
32 Bit Boundary	**Trigger Count**	**Unsigned 32**	**Trigger Count**	**0 - 31**	**4 Bytes**	**28**
32 Bit Boundary	**Decode/Match Count**	**Unsigned 32**	**Decode/Match Count**	**0 - 31**	**4 Bytes**	**32**
32 Bit Boundary	**Mismatch Count**	**Unsigned 32**	**Mismatch Count**	**0 - 31**	**4 Bytes**	**36**
32 Bit Boundary	**NoRead Count**	**Unsigned 32**	**Mismatch Count**	**0 - 31**	**4 Bytes**	**40**
32 Bit Boundary	**Decode Data Length**	**Unsigned 32**	**Decode Data Length**	**0 - 31**	**4 Bytes**	**44**
32 Bit Boundary	**DecodeData**	**VisibleString**		**0 - 1024**	**128 Bytes**	**48**

3.5.3 Input MXL (MicroHAWK→PLC)

Designed to hold 184 bytes of information in the decode data tag, this data can be for 1 decoded string or a delimited number of decoded strings. In the case of a delimited number, the programmer shall parse the decoded data by reading the delimiter in ESP and/or issuing the K Command <K222?> to the command processor.

This input data block also contains a Read Cycle Report and a Decode Cycle Report after an inspection. Details of these reports are described in detail later in the section.

NOTE: This input block must use the Output Premier to function correctly

3.5.3.1 Input MXL Table

SHORT DESCRIPTION	SIZE (BYTES)
INFO BITS	1
DIAGNOSTIC SEQUENCE COUNT	1
CONFIGURATION SEQ. COUNT	1
RESERVED	1
DEVICE STATUS	4
FAULT	4
COUNTERS	24
READ CYCLE REPORT	8
DECODE CYCLE REPORT	16
DECODE LENGTH	4
DECODE DATA	184

Total Size: 248 Bytes

3.5.3.2 Input MXL Description

This section will describe the members for Input MXL data block.

3.5.3.2.1 Input Module Header

The following header is used at the beginning of the input (produced) data block. Definitions for the members are included below.

3.5.3.2.1.1 Info Bits

Bit field of the input module status

INFO BIT FIELD	
BIT RUNMODE	0
BIT CONNECTIONFAULTED	1
BIT DIAGNOSTICACTIVE	2
RESERVED	3-7

3.5.3.2.1.1.1 *Run Mode*

0 = not Run Mode, 1 = Run Mode

3.5.3.2.1.1.2 *Connection Faulted*

Connection to the target is 0 = up and working, 1 = not connected. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.

3.5.3.2.1.1.3 *Diagnostic Active*

0 = No diagnostics active, 1 = One or more diagnostic or prognostics thresholds reached

Note: “Diagnostic” means a detected condition that prevents the primary signal from propagating from a sensor to the controller, or from the controller to an actuator.

3.5.3.2.1.2 Diagnostic Sequence Count

SHORT NAME	**SIZE**
DIAGNOSTIC SEQUENCE COUNT	SINT

Increments for each time a distinct diagnostic condition is detected, and also each time a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.

3.5.3.2.1.3 Configuration Change Detection

When a change in the working set has been detected by the device this bit will be set to 1. This means that the configuration in the project no longer matches the configuration in the device.
Any forward open sets this value back to 0.

3.5.3.2.2 Device Status

This tag describes the current state of the device. In table 1.2.1 the bit field is mapped to allow the user to know what state the device is in.

3.5.3.2.2.1 Device Status Bit Field

DEVICE STATUS

BIT FIELD	Status
0	Online
1	Trigger Acknowledge
2	Exposure Done
3	Decoding
4	Data Is Ready
5	Read Cycle Pass
6	Read Cycle Fail
7	General Fault
8	New match code acknowledged
9	Match Code Enabled
10	Image Sensor Calibrating
11	Image Sensor Calibration Complete
12	Training
13	Training Complete
14	Optimizing
15	Optimization Complete
16	AutoImage Photometry Enabled
17	AutoImage Photometry Complete
18	Output1 Status
19	Output2 Status
20	Output3 Status
21	Buffer Overflow
21-31	Reserved

3.5.3.2.2.2 Online

The units Current Read Cycle State

state

0 = Read cycle is disabled thus the unit is offline but the unit can receive commands. There is no data produced in the Input data block and no data is consumed in the Output data block when in this state.

1 = Read Cycle is enabled and the unit can be triggered and data is available for consumption and the unit will consume output data.

3.5.3.2.2.3 Trigger Acknowledged

This bit will go high when the unit has accepted the Trigger command in the Control tag. The user must lower the Trigger bit in the control tag in order for this bit to go back 0.

3.5.3.2.2.4 Exposure Done

When the image sensor exposure is complete this bit will go high and the user can move the object in the Field of view for the next image to be taken.

3.5.3.2.2.5 Decoding

When the unit is processing the image, this bit will be high. When the unit has completed the image process this bit will go low.

3.5.3.2.2.6 Data is Ready

The Read Cycle and Data Cycle Reports are ready for consumption when this bit goes high.

3.5.3.2.2.7 Read Cycle Pass

If the read cycle has passed all criteria, this bit will go high. It will go low when the ready begins to process the next image.

3.5.3.2.2.8 Ready Cycle Fail

If the read cycle has failed any of the criteria that was programmed, this bit will go high. It will go low when the ready begins to process the next image.

3.5.3.2.2.9 General Fault

When a fault occurs in the unit, this bit will go high. The user can reference the Fault Code tag for the error code and must remedy the problem. After the problem has been resolved the user can reset the fault in the Control tag in the Output data block.

3.5.3.2.2.10 New Match Code Acknowledge

When active the unit has accepted the data read on the last trigger as the new match code. User shall set the Learn New Match Code bit in the Control tag to zero when this bit goes high.

3.5.3.2.2.11 Match Code Enabled

When this bit is 1 the unit will use the Match Code function to determine the Inspection Results.

3.5.3.2.2.12 Image Sensor Calibrating

The unit is undergoing a calibration on one or all of the following:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

When the unit has completed calibration this bit will be set to zero.

3.5.3.2.2.13 Image Sensor Calibration Complete

The unit has completed calibrating the image sensor for one or all of the following items:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

The user shall set the Control bit Calibration Image Sensor to zero if they have not done so already.

3.5.3.2.2.14 Training

When the unit is in the training process, this bit will be set to one. After the training process has completed, this bit will be set to zero.

3.5.3.2.2.15 Training Complete

After the unit has completed the training process, this bit will be set to one. If the user has set the Train Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.3.2.2.16 Optimizing

When the unit is optimizing this bit will be set to one. After optimization has completed, this bit will be set to zero.

3.5.3.2.2.17 Optimization Complete

After the unit has completed the optimization process, this bit will be set to one. If the user has set the Optimize Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.3.2.2.18 AutoImage Photometry Enabled

The unit will use AutoImage Photometry when trying to decode the symbol. Disabling this will mean the unit is using fixed values for Exposure, Gain and (if applicable) focal distance.

3.5.3.2.2.19 AutoImage Photometry Complete

This value will be set to one after the unit has completed an AutoImage Photometry calibration.

3.5.3.2.2.20 Output 1 Status

Current status of the physical output 1 signal

3.5.3.2.2.21 Output 2 Status

Current status of the physical output 2 signal

3.5.3.2.2.22 Output 3 Status

Current status of the physical output 3 signal

3.5.3.2.2.23 Buffer Overflow

When the data in the input buffer exceeds the buffer size (172 bytes) then this bit will go high alerting the user that the data is an incomplete segment.

3.5.3.2.3 Fault Code

This tag shall display the fault codes when the unit has faulted for any commands sent to it. When the user issues the Reset Fault in the Control Tag, this value will be set to zero.

3.5.3.2.4 Counters

Displays the counters stored in the unit upon power up or after a configuration change. These counters can be reset via the output command tag.

3.5.3.2.4.1 Counters Table

COUNTERS	
NOREAD READCYCLE COUNTER	DINT
MISMATCH PER READCYCLE COUNTER	DINT
NOREAD COUNTER	DINT
TRIGGER COUNTER	DINT
MATCH CODE COUNTER	DINT
MISMATCH COUNTER	DINT

NOTE: Time starts over with power on but not with a <A> or <Z> type reset.

3.5.3.2.4.2 NoRead Cycle Counter

The message displays the total number of noread read cycles that have occurred since power-on or the last Noread Read cycle Counter Reset command

3.5.3.2.4.3 MisMatch Per ReadCycle Counter

The message displays the total number of mismatched code pre readcycle that have occurred since power-on or the last Mismatch per Readcycle Counter Reset command

3.5.3.2.4.4 NoRead Counter

The message displays the total number of noreads that have occurred since power-on or the last Noread Counter Reset command

3.5.3.2.4.5 Trigger Counter

The message displays the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command

3.5.3.2.4.6 MatchCode Counter

The message displays either (1) the total number of good reads that match the master label or (2) the total number of good reads, or decodes. The count begins from the last power-on or Match Code/Good Read Counter Reset command. To count the good reads that match the master label, enable Match Code; to count good reads only, disable Match Code

3.5.3.2.4.7 Mismatch Counter

The message displays the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command

3.5.3.2.5 Read Cycle Report

Information regarding the read cycle. Decode Data is referenced in the Decode Cycle Report

3.5.3.2.5.1 Read Cycle Report Table

SHORT DESCRIPTION	SIZE
CAPTURE TIME	INT
TOTAL DECODE TIME	INT
TOTAL READCYCLE TIME	INT
RESERVED	INT

3.5.3.2.5.2 Capture Time

Total time it tool to capture the image

3.5.3.2.5.3 Total Decode Time

Total time spent decoding the symbol(s)

3.5.3.2.5.4 Total ReadCycle Time

Total Time Spent decoding the symbol which is the sum of the Capture, Decode and Overhead time.

3.5.3.2.6 Decode Cycle Report

Information on the decoded symbol

3.5.3.2.6.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	FLOAT

3.5.3.2.6.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.3.2.6.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.3.2.6.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.3.2.6.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.3.2.6.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.3.2.6.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
COMPOSITE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.3.2.6.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.3.2.6.8 Decode Length

The number of characters found in the decode string

3.5.3.2.7 Decode Length

The total number of characters contained in the Decode Data SINT array

3.5.3.2.8 Decode Data

Outputted decode data from the unit in ASCII with one difference. Preamble and post amble symbols are not added.

3.5.3.3 Input MXL Member location

The following table is the Member location in the Input MXL data block.

3.5.3.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Data Length	Byte Offset
	InfoBits	**Unsigned32**			**1 Byte**	**0**
32 Bit Boundary	BIT RunMode	Boolean	InfoBits	0	1 Bit	
	BIT ConnectionFaulted	Boolean	InfoBits	1	1 Bit	
	BIT DiagnosticActive	Boolean	InfoBits	2	1 Bit	
	Reserved	Boolean	InfoBits	3 - 7	5 Bits	
	DiagnosticSequenceCount	**Unsigned8**			**1Byte**	**1**
	ConfigurationChangeDetect	**Unsigned8**			**1 Byte**	
	ConfigChangeDetect	**Unsigned8**	ConfigurationChangeDetect	0	1 Bit	
	Reserved	**Unsigned8**	ConfigurationChangeDetect	1 - 7	7 Bits	
	Reserved	**Unsigned8**			**1 Byte**	**3**
	DeviceStatus	**Unsigned32**			**4 Bytes**	**4**
32 Bit Boundary	Online	Boolean	DeviceStatus	0	1 Bit	
	TriggerAcknowledge	Boolean	DeviceStatus	1	1 Bit	
	ExposureDone	Boolean	DeviceStatus	2	1 Bit	
	Decoding	Boolean	DeviceStatus	3	1 Bit	
	DataIsReady	Boolean	DeviceStatus	4	1 Bit	
	ReadCyclePass	Boolean	DeviceStatus	5	1 Bit	
	ReadCycleFail	Boolean	DeviceStatus	6	1 Bit	
	GeneralFault	Boolean	DeviceStatus	7	1 Bit	
	NewMatchCodeAcknowledged	Boolean	DeviceStatus	8	1 Bit	
	MatchCodeEnabled	Boolean	DeviceStatus	9	1 Bit	
	ImageSensorCalibrating	Boolean	DeviceStatus	10	1 Bit	
	ImageSensorCalibrationComplete	Boolean	DeviceStatus	11	1 Bit	
	Training	Boolean	DeviceStatus	12	1 Bit	
	TrainingComplete	Boolean	DeviceStatus	13	1 Bit	
	Optimizing	Boolean	DeviceStatus	14	1 Bit	

	OptimizingComplete	Boolean	DeviceStatus	15	1 Bit	
	AutoImagePhotometryEnabled	Boolean	DeviceStatus	16	1 Bit	
	AutoImagePhotometryComplete	Boolean	DeviceStatus	17	1 Bit	
	Output1Status	Boolean	DeviceStatus	18	1 Bit	
	Output2Status	Boolean	DeviceStatus	19	1 Bit	
	BufferOverflow	Boolean	DeviceStatus	20	1 Bit	
	Reserved	-	DeviceStatus	21-31	11 Bits	
	Fault Code	**Unsigned32**			**4 Bytes**	
32 Bit Boundary	CommandErrorDetected	Boolean	FaultCode	0	1 Bit	**8**
	CommunicationError	Boolean	FaultCode	1	1 Bit	
	FlashSectorUnprotectedFailure	Boolean	FaultCode	2	1 Bit	
	HostPortBufferOverflow	Boolean	FaultCode	3	1 Bit	
	Reserved	Boolean	FaultCode	4 - 31	28 Bits	
	Counters	Boolean			**24 Bytes**	
32 Bit Boundary	NoReadReadCycleCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**12**
32 Bit Boundary	MismatchPerReadcycleCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**16**
32 Bit Boundary	NoreadCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**20**
32 Bit Boundary	TriggerCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**24**
32 Bit Boundary	MatchCodeCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**28**
32 Bit Boundary	MismatchCounter	**Unsigned32**	Counters	0 - 31	4 Bytes	**32**
	ReadCycleReport	**Unsigned16**			**8 Bytes**	
32 Bit Boundary	CaptureTime	**Unsigned16**	ReadCycleReport	0 - 15	2 Bytes	**36**
	TotalDecodeTime	**Unsigned16**	ReadCycleReport	0 - 15	2 Bytes	**38**
32 Bit Boundary	TotalReadCycleTime	**Unsigned16**	ReadCycleReport	0 - 15	2 Bytes	**40**
	Reserved	**Unsigned16**	ReadCycleReport	0 - 15	2 Bytes	**42**
	DecodeCycleReport				**16 Bytes**	
32 Bit Boundary	DecodeLocationTop	**Unsigned16**	DecodeCycleReport	0 - 15	2 Bytes	**44**
	DecodeLocationLeft	**Unsigned16**	DecodeCycleReport	0 - 15	2 Bytes	**46**
32 Bit Boundary	DecodeLocationHeight	**Unsigned16**	DecodeCycleReport	0 - 15	2 Bytes	**48**
	DecodeLocationWidth	**Unsigned16**	DecodeCycleReport	0 - 15	2 Bytes	**50**
	CodeType (Subset)	**Unsigned32**	DecodeCycleReport		4 Bytes	
32 Bit Boundary	AztecCode	Boolean	CodeType	0	1 Bit	**52**
	MicroQRCode	Boolean	CodeType	1	1 Bit	
	PostalCode	Boolean	CodeType	2	1 Bit	
	Code39	Boolean	CodeType	3	1 Bit	

	Codeabar	Boolean	CodeType	4	1 Bit	
	Interleaved2of5	Boolean	CodeType	5	1 Bit	
	UPCEAN	Boolean	CodeType	6	1 Bit	
	Code128EAN128	Boolean	CodeType	7	1 Bit	
	Code93	Boolean	CodeType	8	1 Bit	
	PD417	Boolean	CodeType	9	1 Bit	
	PharmaCode	Boolean	CodeType	10	1 Bit	
	DataMatrix	Boolean	CodeType	11	1 Bit	
	QRCode	Boolean	CodeType	12	1 Bit	
	BC412	Boolean	CodeType	13	1 Bit	
	RSS14	Boolean	CodeType	14	1 Bit	
	RSS14LTD	Boolean	CodeType	15	1 Bit	
	RSS14EXP	Boolean	CodeType	16	1 Bit	
	MicroPDF	Boolean	CodeType	17	1 Bit	
	Composite	Boolean	CodeType	18	1 Bit	
	DotCode	Boolean	CodeType	19	1 Bit	
	Reserved for future use	Boolean	CodeType	20 - 31	12 Bits	
32 Bit Boundary	PixelsPerElement	Float32	DecodeCycleReport	0 - 31	4 Bytes	**56**
32 Bit Boundary	**DecodeLength**	**Unsigned32**		**0 - 31**	**4 Bytes**	**60**
32 Bit Boundary	**DecodeData**	**VisibleString**		**0 - 1472**	**184 Bytes**	**64**

3.5.4 Input 1 Decode (MicroHAWK→PLC)

Designed to hold 436 bytes of information in the decode data tag. This data can be for 1 decoded string or a delimited number of decoded strings. In the case of a delimited number, the programmer shall parse the decoded data by reading the delimiter in ESP and/or issuing the K Command <K222?> to the command processor.

This input data block also contains a Read Cycle Report and a Decode Cycle Report after an inspection. Details of these reports are described in detail later in the section.

NOTE: This input block must use the Output Premier to function correctly

3.5.4.1 Input 1 Decode Table

SHORT DESCRIPTION	SIZE (BYTES)
INFO BITS	1
DIAGNOSTIC SEQUENCE COUNT	1
CONFIGURATION SEQ. COUNT	1
RESERVED	1
DEVICE STATUS	4
FAULT	4
COUNTERS	24
READ CYCLE REPORT	8
DECODE CYCLE REPORT	16
DECODE LENGTH	4
DECODE DATA	436

Total Size: 500 Bytes

3.5.4.2 Input 1 Decode Description

This sub section will describe the tag and each field related for the Input 1 Decode data block.

3.5.4.2.1 Input Module Header

The following header is used at the beginning of the input (produced) data block. Definitions for the members are included below.

3.5.4.2.1.1 Info Bits

Bit field of the input module status

INFO BIT FIELD	
BIT RUNMODE	0
BIT CONNECTIONFAULTED	1
BIT DIAGNOSTICACTIVE	2
RESERVED	3-7

3.5.4.2.1.1.1 *Run Mode*

0 = not Run Mode, 1 = Run Mode

3.5.4.2.1.1.2 *Connection Faulted*

Connection to the target is 0 = up and working, 1 = not connected. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.

3.5.4.2.1.1.3 *Diagnostic Active*

0 = No diagnostics active, 1 = One or more diagnostic or prognostics thresholds reached

Note: “Diagnostic” means a detected condition that prevents the primary signal from propagating from a sensor to the controller, or from the controller to an actuator.

3.5.4.2.1.2 Diagnostic Sequence Count

SHORT NAME	SIZE
DIAGNOSTIC SEQUENCE COUNT	SINT

Increments for each time a distinct diagnostic condition is detected, and also each time a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.

3.5.4.2.1.3 Configuration Change Detection

When a change in the working set has been detected by the device this bit will be set to 1. This means that the configuration in the project no longer matches the configuration in the device.
Any forward open sets this value back to 0.

3.5.4.2.2 Device Status

This tag describes the current state of the device. In table 1.2.1 the bit field is mapped to allow the user to know what state the device is in.

3.5.4.2.2.1 Device Status Bit Field

DEVICE STATUS

BIT FIELD	Status
0	Online
1	Trigger Acknowledge
2	Exposure Done
3	Decoding
4	Data Is Ready
5	Read Cycle Pass
6	Read Cycle Fail
7	General Fault
8	New match code acknowledged
9	Match Code Enabled
10	Image Sensor Calibrating
11	Image Sensor Calibration Complete
12	Training
13	Training Complete
14	Optimizing
15	Optimization Complete
16	AutoImage Photometry Enabled
17	AutoImage Photometry Complete
18	Output1 Status
19	Output2 Status
20	Output3 Status
21	Buffer Overflow
22-31	Reserved

3.5.4.2.2.2 Online

The units Current Read Cycle State

state

0 = Read cycle is disabled thus the unit is offline but the unit can receive commands. There is no data produced in the Input data block and no data is consumed in the Output data block when in this state.

1 = Read Cycle is enabled and the unit can be triggered and data is available for consumption and the unit will consume output data.

3.5.4.2.2.3 Trigger Acknowledged

This bit will go high when the unit has accepted the Trigger command in the Control tag. The user must lower the Trigger bit in the control tag in order for this bit to go back 0.

3.5.4.2.2.4 Exposure Done

When the image sensor exposure is complete this bit will go high and the user can move the object in the Field of view for the next image to be taken.

3.5.4.2.2.5 Decoding

When the unit is processing the image, this bit will be high. When the unit has completed the image process this bit will go low.

3.5.4.2.2.6 Data is Ready

The Read Cycle and Data Cycle Reports are ready for consumption when this bit goes high.

3.5.4.2.2.7 Read Cycle Pass

If the read cycle has passed all criteria, this bit will go high. It will go low when the ready begins to process the next image.

3.5.4.2.2.8 Ready Cycle Fail

If the read cycle has failed any of the criteria that was programmed, this bit will go high. It will go low when the ready begins to process the next image.

3.5.4.2.2.9 General Fault

When a fault occurs in the unit, this bit will go high. The user can reference the Fault Code tag for the error code and must remedy the problem. After the problem has been resolved the user can reset the fault in the Control tag in the Output data block.

3.5.4.2.2.10 New Match Code Acknowledge

When active the unit has accepted the data read on the last trigger as the new match code. User shall set the Learn New Match Code bit in the Control tag to zero when this bit goes high.

3.5.4.2.2.11 Match Code Enabled

When this bit is 1 the unit will use the Match Code function to determine the Inspection Results.

3.5.4.2.2.12 Image Sensor Calibrating

The unit is undergoing a calibration on one or all of the following:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

When the unit has completed calibration this bit will be set to zero.

3.5.4.2.2.13 Image Sensor Calibration Complete

The unit has completed calibrating the image sensor for one or all of the following items:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

The user shall set the Control bit Calibration Image Sensor to zero if they have not done so already.

3.5.4.2.2.14 Training

When the unit is in the training process, this bit will be set to one. After the training process has completed, this bit will be set to zero.

3.5.4.2.2.15 Training Complete

After the unit has completed the training process, this bit will be set to one. If the user has set the Train Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.4.2.2.16 Optimizing

When the unit is optimizing this bit will be set to one. After optimization has completed, this bit will be set to zero.

3.5.4.2.2.17 Optimization Complete

After the unit has completed the optimization process, this bit will be set to one. If the user has set the Optimize Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.4.2.2.18 AutoImage Photometry Enabled

The unit will use AutoImage Photometry when trying to decode the symbol. Disabling this will mean the unit is using fixed values for Exposure, Gain and (if applicable) focal distance.

3.5.4.2.2.19 AutoImage Photometry Complete

This value will be set to one after the unit has completed an AutoImage Photometry calibration.

3.5.4.2.2.20 Output 1 Status

Current status of the physical output 1 signal

3.5.4.2.2.21 Output 2 Status

Current status of the physical output 2 signal

3.5.4.2.2.22 Output 3 Status

Current status of the physical output 3 signal

3.5.4.2.2.23 Buffer Overflow

When the data in the input buffer exceeds the buffer size (444 bytes) then this bit will go high alerting the user that the data is an incomplete segment.

3.5.4.2.3 Fault Code

This tag shall display the fault codes when the unit has faulted for any commands sent to it. When the user issues the Reset Fault in the Control Tag, this value will be set to zero.

3.5.4.2.3.1 Fault Code Bit Field

COUNTERS	
COMMAND ERROR DETECTED	0
COMMUNICATION ERROR	1
FLASH SECTOR UNPROTECTED FAILURE	2
HOST PORT BUFFER OVERFLOW	3
RESERVED	4-31

3.5.4.2.4 Counters

Displays the counters stored in the unit upon power up or after a configuration change. These counters can be reset via the output command tag.

3.5.4.2.4.1 Counters Table

COUNTERS	
NOREAD READCYCLE COUNTER	DINT
MISMATCH PER READCYCLE COUNTER	DINT
NOREAD COUNTER	DINT
TRIGGER COUNTER	DINT
MATCH CODE COUNTER	DINT
MISMATCH COUNTER	DINT

NOTE: Time starts over with power on but not with a <A> or <Z> type reset.

3.5.4.2.4.2 NoRead Cycle Counter

The message displays the total number of noread read cycles that have occurred since power-on or the last Noread Read cycle Counter Reset command

3.5.4.2.4.3 MisMatch Per ReadCycle Counter

The message displays the total number of mismatched code pre readcycle that have occurred since power-on or the last Mismatch per Readcycle Counter Reset command

3.5.4.2.4.4 NoRead Counter

The message displays the total number of noreads that have occurred since power-on or the last Noread Counter Reset command

3.5.4.2.4.5 Trigger Counter

The message displays the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command

3.5.4.2.4.6 MatchCode Counter

The message displays either (1) the total number of good reads that match the master label or (2) the total number of good reads, or decodes. The count begins from the last power-on or Match Code/Good

Read Counter Reset command. To count the good reads that match the master label, enable Match Code; to count good reads only, disable Match Code

3.5.4.2.4.7 Mismatch Counter

The message displays the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command

3.5.4.2.5 Read Cycle Report

Information regarding the read cycle. Decode Data is referenced in the Decode Cycle Report

3.5.4.2.5.1 Read Cycle Report Table

SHORT DESCRIPTION	SIZE
CAPTURE TIME	INT
TOTAL DECODE TIME	INT
TOTAL READCYCLE TIME	INT
RESERVED	INT

3.5.4.2.5.2 Capture Time

Total time it tool to capture the image

3.5.4.2.5.3 Total Decode Time

Total time spent decoding the symbol(s)

3.5.4.2.5.4 Total ReadCycle Time

Total Time Spent decoding the symbol which is the sum of the Capture, Decode and Overhead time.

3.5.4.2.6 Decode Cycle Report

Information on the decoded symbol

3.5.4.2.6.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL

3.5.4.2.6.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.4.2.6.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.4.2.6.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.4.2.6.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.4.2.6.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.4.2.6.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.4.2.6.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.4.2.7 Decode Length

The number of characters found in the decode string

3.5.4.2.8 Decode Data

Outputted decode data from the unit in ASCII with one difference. Preamble and post amble symbols are not added.

3.5.4.3 Input 1 Decode Member Location

The following table is the Member location in the Input 1 Decode data block.

3.5.4.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Style	Data Length	Byte Offset
	InfoBits	**Unsigned32**				**1 Byte**	**0**
32 Bit Boundary	BIT RunMode	Boolean	InfoBits	0	NA	1 Bit	
	BIT ConnectionFaulted	Boolean	InfoBits	1	NA	1 Bit	
	BIT DiagnosticActive	Boolean	InfoBits	2	NA	1 Bit	
	Reserved	Boolean	InfoBits	3 - 7	NA	5 Bits	
	DiagnosticSequenceCount	**Unsigned8**			**Decimal**	**1Byte**	**1**
	ConfigurationChangeDetect	**Unsigned8**				**1 Byte**	
	ConfigChangeDetect	**Unsigned8**	ConfigurationChangeDetect	0	BOOL	1 Bit	
	Reserved	**Unsigned8**	ConfigurationChangeDetect	1 - 7	NA	7 Bits	
	Reserved	**Unsigned8**			**NA**	**1 Byte**	**3**
	DeviceStatus	**Unsigned32**				**4 Bytes**	**4**
32 Bit Boundary	Online	Boolean	DeviceStatus	0	BOOL	1 Bit	
	TriggerAcknowledge	Boolean	DeviceStatus	1	BOOL	1 Bit	
	ExposureDone	Boolean	DeviceStatus	2	BOOL	1 Bit	
	Decoding	Boolean	DeviceStatus	3	BOOL	1 Bit	
	DataIsReady	Boolean	DeviceStatus	4	BOOL	1 Bit	
	ReadCyclePass	Boolean	DeviceStatus	5	BOOL	1 Bit	
	ReadCycleFail	Boolean	DeviceStatus	6	BOOL	1 Bit	
	GeneralFault	Boolean	DeviceStatus	7	BOOL	1 Bit	
	NewMatchCodeAcknowledged	Boolean	DeviceStatus	8	BOOL	1 Bit	
	MatchCodeEnabled	Boolean	DeviceStatus	9	BOOL	1 Bit	
	ImageSensorCalibrating	Boolean	DeviceStatus	10	BOOL	1 Bit	
	ImageSensorCalibrationComplete	Boolean	DeviceStatus	11	BOOL	1 Bit	
	Training	Boolean	DeviceStatus	12	BOOL	1 Bit	
	TrainingComplete	Boolean	DeviceStatus	13	BOOL	1 Bit	
	Optimizing	Boolean	DeviceStatus	14	BOOL	1 Bit	
	OptimizingComplete	Boolean	DeviceStatus	15	BOOL	1 Bit	
	AutoImagePhotometryEnabled	Boolean	DeviceStatus	16	BOOL	1 Bit	

	AutoImagePhotometryComplete	Boolean	DeviceStatus	17	BOOL	1 Bit	
	Output1Status	Boolean	DeviceStatus	18	BOOL	1 Bit	
	Output2Status	Boolean	DeviceStatus	19	BOOL	1 Bit	
	BufferOverflow	Boolean	DeviceStatus	20	BOOL	1 Bit	
	Reserved	-	DeviceStatus	21-31	NA	11 Bits	
	Fault Code	**Unsigned32**				**4 Bytes**	
32 Bit Boundary	CommandErrorDetected	Boolean	FaultCode	0	BOOL	1 Bit	**8**
	CommunicationError	Boolean	FaultCode	1	BOOL	1 Bit	
	FlashSectorUnprotectedFailure	Boolean	FaultCode	2	BOOL	1 Bit	
	HostPortBufferOverflow	Boolean	FaultCode	3	BOOL	1 Bit	
	Reserved	Boolean	FaultCode	4 - 31	NA	28 Bits	
	Counters					**24 Bytes**	
32 Bit Boundary	NoReadReadCycleCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**12**
32 Bit Boundary	MismatchPerReadcycleCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**16**
32 Bit Boundary	NoreadCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**20**
32 Bit Boundary	TriggerCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**24**
32 Bit Boundary	MatchCodeCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**28**
32 Bit Boundary	MismatchCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	**32**
	ReadCycleReport					**8 Bytes**	
32 Bit Boundary	CaptureTime	Unsigned16	ReadCycleReport	0 - 15	Decimal	2 Bytes	**36**
	TotalDecodeTime	Unsigned16	ReadCycleReport	0 - 15	Decimal	2 Bytes	**38**
32 Bit Boundary	TotalReadCycleTime	Unsigned16	ReadCycleReport	0 - 15	Decimal	2 Bytes	**40**
	Reserved	Unsigned16	ReadCycleReport	0 - 15	NA	2 Bytes	**42**
	DecodeCycleReport					**16 Bytes**	
32 Bit Boundary	DecodeLocationTop	Unsigned16	DecodeCycleReport	0 - 15	Decimal	2 Bytes	**44**
	DecodeLocationLeft	Unsigned16	DecodeCycleReport	0 - 15	Decimal	2 Bytes	**46**
32 Bit Boundary	DecodeLocationHeight	Unsigned16	DecodeCycleReport	0 - 15	Decimal	2 Bytes	**48**
	DecodeLocationWidth	Unsigned16	DecodeCycleReport	0 - 15	Decimal	2 Bytes	**50**
	CodeType (Subset)	**Unsigned32**	DecodeCycleReport			4 Bytes	
32 Bit Boundary	AztecCode	Boolean	CodeType	0	BOOL	1 Bit	**52**
	MicroQRCode	Boolean	CodeType	1	BOOL	1 Bit	
	PostalCode	Boolean	CodeType	2	BOOL	1 Bit	
	Code39	Boolean	CodeType	3	BOOL	1 Bit	
	Codeabar	Boolean	CodeType	4	BOOL	1 Bit	

	Interleaved2of5	Boolean	CodeType	5	BOOL	1 Bit	
	UPCEAN	Boolean	CodeType	6	BOOL	1 Bit	
	Code128EAN128	Boolean	CodeType	7	BOOL	1 Bit	
	Code93	Boolean	CodeType	8	BOOL	1 Bit	
	PD417	Boolean	CodeType	9	BOOL	1 Bit	
	PharmaCode	Boolean	CodeType	10	BOOL	1 Bit	
	DataMatrix	Boolean	CodeType	11	BOOL	1 Bit	
	QRCode	Boolean	CodeType	12	BOOL	1 Bit	
	BC412	Boolean	CodeType	13	BOOL	1 Bit	
	RSS14	Boolean	CodeType	14	BOOL	1 Bit	
	RSS14LTD	Boolean	CodeType	15	BOOL	1 Bit	
	RSS14EXP	Boolean	CodeType	16	BOOL	1 Bit	
	MicroPDF	Boolean	CodeType	17	BOOL	1 Bit	
	Composite	Boolean	CodeType	18	BOOL	1 Bit	
	DotCode	Boolean	CodeType	19	BOOL	1 Bit	
	Reserved for future use	Boolean	CodeType	20 - 31	BOOL	12 Bits	
32 Bit Boundary	PixelsPerElement	Float32	DecodeCycleReport	0 - 31	Decimal	4 Bytes	**56**
32 Bit Boud	**DecodeLength**	**Unsigned32**		**0 - 31**	**Decimal**	**4 Bytes**	**60**
32 Bit Boundary	**DecodeData**	**VisibleString**		**0 - 3488**	**ASCII**	**436 Bytes**	**64**

3.5.5 Input 4 Decode (MicroHAWK→PLC)

Designed to hold 4 decoded symbols with decode cycle reports. The read cycle report contains data for the entire inspection while the decode # cycle report will contain data regarding the individual decoded symbols. Please note that decode symbol 1 is 160 bytes long while 2 through 4 are 72 bytes long. The unit will automatically place the largest decode symbol into Decode 1 Cycle Report and Decode 1 Data. The remaining will be placed in the remaining tags. If no data is found than the decode cycle report and the decode data will be null.

***NOTE 1: The inspection will not need to have 4 decode symbols to use this input data block. ***

NOTE 2: This input block must use the Output Premier to function correctly

3.5.5.1 Input 4 Decode Table

SHORT DESCRIPTION	SIZE (BYTES)
INFO BITS	1
DIAGNOSTIC SEQUENCE COUNT	1
CONFIGURATION SEQ. COUNT	1
RESERVED	1
DEVICE STATUS	4
FAULT	4
COUNTERS	24
READ CYCLE REPORT	8
DECODE 1 CYCLE REPORT	16
DECODE 1 LENGTH	4
DECODE 1 DATA	160
DECODE 2 CYCLE REPORT	16
DECODE 2 LENGTH	4
DECODE 2 DATA	72
DECODE 3 CYCLE REPORT	16
DECODE 3 LENGTH	4
DECODE 3 DATA	72
DECODE 4 CYCLE REPORT	16
DECODE 4 LENGTH	4
DECODE 4 DATA	72

Total Size: 500 Bytes

3.5.5.2 Input 4 Decode Description

This sub section will describe the tag and each field related for the Input Assembly.

3.5.5.2.1 Input Module Header

The following header is used at the beginning of the input (produced) data block. Definitions for the members are included below.

3.5.5.2.1.1 Info Bits

Bit field of the input module status

INFO BIT FIELD	
BIT RUNMODE	0
BIT CONNECTIONFAULTED	1
BIT DIAGNOSTICACTIVE	2
RESERVED	3-7

3.5.5.2.1.1.1 *Run Mode*

0 = not Run Mode, 1 = Run Mode

3.5.5.2.1.1.2 *Connection Faulted*

Connection to the target is 0 = up and working, 1 = not connected. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.

3.5.5.2.1.1.3 *Diagnostic Active*

0 = No diagnostics active, 1 = One or more diagnostic or prognostics thresholds reached

Note: “Diagnostic” means a detected condition that prevents the primary signal from propagating from a sensor to the controller, or from the controller to an actuator.

3.5.5.2.1.2 Diagnostic Sequence Count

SHORT NAME	**SIZE**
DIAGNOSTIC SEQUENCE COUNT	SINT

Increments for each time a distinct diagnostic condition is detected, and also each time a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.

3.5.5.2.1.3 Configuration Change Detection

When a change in the working set has been detected by the device this bit will be set to 1. This means that the configuration in the project no longer matches the configuration in the device.
Any forward open sets this value back to 0.

3.5.5.2.2 Device Status

This tag describes the current state of the device. In table 1.2.1 the bit field is mapped to allow the user to know what state the device is in.

3.5.5.2.2.1 Device Status Bit Field

DEVICE STATUS

BIT FIELD	Status
0	Online
1	Trigger Acknowledge
2	Exposure Done
3	Decoding
4	Data Is Ready
5	Read Cycle Pass
6	Read Cycle Fail
7	General Fault
8	New match code acknowledged
9	Match Code Enabled
10	Image Sensor Calibrating
11	Image Sensor Calibration Complete
12	Training
13	Training Complete
14	Optimizing
15	Optimization Complete
16	AutoImage Photometry Enabled
17	AutoImage Photometry Complete
18	Output1 Status
19	Output2 Status
20	Output3 Status
21	Buffer Overflow
22-31	Reserved

3.5.5.2.2.2 Online

The units Current Read Cycle State

state

0 = Read cycle is disabled thus the unit is offline but the unit can receive commands. There is no data produced in the Input data block and no data is consumed in the Output data block when in this state.

1 = Read Cycle is enabled and the unit can be triggered and data is available for consumption and the unit will consume output data.

3.5.5.2.2.3 Trigger Acknowledged

This bit will go high when the unit has accepted the Trigger command in the Control tag. The user must lower the Trigger bit in the control tag in order for this bit to go back 0.

3.5.5.2.2.4 Exposure Done

When the image sensor exposure is complete this bit will go high and the user can move the object in the Field of view for the next image to be taken.

3.5.5.2.2.5 Decoding

When the unit is processing the image, this bit will be high. When the unit has completed the image process this bit will go low.

3.5.5.2.2.6 Data is Ready

The Read Cycle and Data Cycle Reports are ready for consumption when this bit goes high.

3.5.5.2.2.7 Read Cycle Pass

If the read cycle has passed all criteria, this bit will go high. It will go low when the ready begins to process the next image.

3.5.5.2.2.8 Ready Cycle Fail

If the read cycle has failed any of the criteria that was programmed, this bit will go high. It will go low when the ready begins to process the next image.

3.5.5.2.2.9 General Fault

When a fault occurs in the unit, this bit will go high. The user can reference the Fault Code tag for the error code and must remedy the problem. After the problem has been resolved the user can reset the fault in the Control tag in the Output data block.

3.5.5.2.2.10 New Match Code Acknowledge

When active the unit has accepted the data read on the last trigger as the new match code. User shall set the Learn New Match Code bit in the Control tag to zero when this bit goes high.

3.5.5.2.2.11 Match Code Enabled

When this bit is 1 the unit will use the Match Code function to determine the Inspection Results.

3.5.5.2.2.12 Image Sensor Calibrating

The unit is undergoing a calibration on one or all of the following:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

When the unit has completed calibration this bit will be set to zero.

3.5.5.2.2.13 Image Sensor Calibration Complete

The unit has completed calibrating the image sensor for one or all of the following items:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

The user shall set the Control bit Calibration Image Sensor to zero if they have not done so already.

3.5.5.2.2.14 Training

When the unit is in the training process, this bit will be set to one. After the training process has completed, this bit will be set to zero.

3.5.5.2.2.15 Training Complete

After the unit has completed the training process, this bit will be set to one. If the user has set the Train Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.5.2.2.16 Optimizing

When the unit is optimizing this bit will be set to one. After optimization has completed, this bit will be set to zero.

3.5.5.2.2.17 Optimization Complete

After the unit has completed the optimization process, this bit will be set to one. If the user has set the Optimize Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.5.2.2.18 AutoImage Photometry Enabled

The unit will use AutoImage Photometry when trying to decode the symbol. Disabling this will mean the unit is using fixed values for Exposure, Gain and (if applicable) focal distance.

3.5.5.2.2.19 AutoImage Photometry Complete

This value will be set to one after the unit has completed an AutoImage Photometry calibration.

3.5.5.2.2.20 Output 1 Status

Current status of the physical output 1 signal

3.5.5.2.2.21 Output 2 Status

Current status of the physical output 2 signal

3.5.5.2.2.22 Output 3 Status

Current status of the physical output 3 signal

3.5.5.2.2.23 Buffer Overflow

When the data in the input buffer exceeds the buffer size (444 bytes) then this bit will go high alerting the user that the data is an incomplete segment.

3.5.5.2.3 Fault Code

This tag shall display the fault codes when the unit has faulted for any commands sent to it. When the user issues the Reset Fault in the Control Tag, this value will be set to zero.

3.5.5.2.3.1 Fault Code Bit Field

COUNTERS	
COMMAND ERROR DETECTED	0
COMMUNICATION ERROR	1
FLASH SECTOR UNPROTECTED FAILURE	2
HOST PORT BUFFER OVERFLOW	3
RESERVED	4-31

3.5.5.2.4 Counters

Displays the counters stored in the unit upon power up or after a configuration change. These counters can be reset via the output command tag.

3.5.5.2.4.1 Counters Table

COUNTERS	
NOREAD READCYCLE COUNTER	DINT
MISMATCH PER READCYCLE COUNTER	DINT
NOREAD COUNTER	DINT
TRIGGER COUNTER	DINT
MATCH CODE COUNTER	DINT
MISMATCH COUNTER	DINT

NOTE: Time starts over with power on but not with a <A> or <Z> type reset.

3.5.5.2.4.2 NoRead Cycle Counter

The message displays the total number of noread read cycles that have occurred since power-on or the last Noread Read cycle Counter Reset command

3.5.5.2.4.3 MisMatch Per ReadCycle Counter

The message displays the total number of mismatched code pre readcycle that have occurred since power-on or the last Mismatch per Readcycle Counter Reset command

3.5.5.2.4.4 NoRead Counter

The message displays the total number of noreads that have occurred since power-on or the last Noread Counter Reset command

3.5.5.2.4.5 Trigger Counter

The message displays the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command

3.5.5.2.4.6 MatchCode Counter

The message displays either (1) the total number of good reads that match the master label or (2) the total number of good reads, or decodes. The count begins from the last power-on or Match Code/Good Read Counter Reset command. To count the good reads that match the master label, enable Match Code; to count good reads only, disable Match Code

3.5.5.2.4.7 Mismatch Counter

The message displays the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command

3.5.5.2.5 Read Cycle Report

Information regarding the read cycle. Decode Data is referenced in the Decode Cycle Report

3.5.5.2.5.1 Read Cycle Report Table

SHORT DESCRIPTION	SIZE
CAPTURE TIME	INT
TOTAL DECODE TIME	INT
TOTAL READCYCLE TIME	INT
RESERVED	INT

3.5.5.2.5.2 Capture Time

Total time it tool to capture the image

3.5.5.2.5.3 Total Decode Time

Total time spent decoding the symbol(s)

3.5.5.2.5.4 Total ReadCycle Time

Total Time Spent decoding the symbol which is the sum of the Capture, Decode and Overhead time.

3.5.5.2.6 Decode 1 Cycle Report

Information on the decoded symbol

3.5.5.2.6.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL

3.5.5.2.6.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.5.2.6.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.5.2.6.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.6.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.6.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.5.2.6.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.5.2.6.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.5.2.7 Decode 1 Length

The total number of characters contained in the Decode Data SINT array

3.5.5.2.8 Decode 1 Data

Outputted decode 1 symbol data from the unit with one difference. Preamble and post amble symbols are not added. Maximum characters allowed is 160.

3.5.5.2.9 Decode 2 Cycle Report

Information on the decoded symbol

3.5.5.2.9.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL

3.5.5.2.9.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.5.2.9.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.5.2.9.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.9.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.9.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.5.2.9.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.5.2.9.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.5.2.10 Decode 2 Length

The total number of characters contained in the Decode Data SINT array

3.5.5.2.11 Decode 2 Data

Outputted decode 2 symbol data from the unit with one difference. Preamble and post amble symbols are not added. Maximum characters allowed is 72.

3.5.5.2.12 Decode 3 Cycle Report

Information on the decoded symbol

3.5.5.2.12.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL
DECODE 3 LENGTH **DINT** **DECODE DATA** **SINT[72]**	

3.5.5.2.12.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.5.2.12.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.5.2.12.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.12.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.12.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.5.2.12.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.5.2.12.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.5.2.13 Decode 3 Length

The total number of characters contained in the Decode Data SINT array

3.5.5.2.14 Decode 3 Data

Outputted decode 3 symbol data from the unit with one difference. Preamble and post amble symbols are not added. Maximum characters allowed is 72.

3.5.5.2.15 Decode 4 Cycle Report

Information on the decoded symbol

3.5.5.2.15.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL

3.5.5.2.15.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.5.2.15.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.5.2.15.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.15.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.5.2.15.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.5.2.15.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.5.2.15.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.5.2.16 Decode 4 Length

The total number of characters contained in the Decode Data SINT array

3.5.5.2.17 Decode 4 Data

Outputted decode 4 symbol data from the unit with one difference. Preamble and post amble symbols are not added. Maximum characters allowed is 72.

3.5.5.3 Input 4 Decode Member Location

The following table is where members for the Input 4 Decode data block are located.

3.5.5.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Hidden	Style	Radix	Data Length
	InfoBits	**Unsigned32**			**TRUE**			**1 Byte**
32 Bit Boundary	BIT RunMode	Boolean	InfoBits	0		NA		1 Bit
	BIT ConnectionFaulted	Boolean	InfoBits	1		NA		1 Bit
	BIT DiagnosticActive	Boolean	InfoBits	2		NA		1 Bit
	Reserved	Boolean	InfoBits	3 - 7	TRUE	NA		5 Bits
	DiagnosticSequenceCount	**Unsigned8**				**Decimal**		**1Byte**
	ConfigurationChangeDetect	**Unsigned8**						**1 Byte**
	ConfigChangeDetect	**Unsigned8**	ConfigurationChangeDetect	0		BOOL		1 Bit
	Reserved	**Unsigned8**	ConfigurationChangeDetect	1 - 7	TRUE	NA		7 Bits
	Reserved	**Unsigned8**			**TRUE**	**NA**		**1 Byte**
	DeviceStatus	**Unsigned32**						**4 Bytes**
32 Bit Boundary	Online	Boolean	DeviceStatus	0		BOOL		1 Bit
	TriggerAcknowledge	Boolean	DeviceStatus	1		BOOL		1 Bit
	ExposureDone	Boolean	DeviceStatus	2		BOOL		1 Bit
	Decoding	Boolean	DeviceStatus	3		BOOL		1 Bit
	DataIsReady	Boolean	DeviceStatus	4		BOOL		1 Bit
	ReadCyclePass	Boolean	DeviceStatus	5		BOOL		1 Bit
	ReadCycleFail	Boolean	DeviceStatus	6		BOOL		1 Bit
	GeneralFault	Boolean	DeviceStatus	7		BOOL		1 Bit
	NewMatchCodeAcknowledged	Boolean	DeviceStatus	8		BOOL		1 Bit
	MatchCodeEnabled	Boolean	DeviceStatus	9		BOOL		1 Bit
	ImageSensorCalibrating	Boolean	DeviceStatus	10		BOOL		1 Bit
	ImageSensorCalibrationComplete	Boolean	DeviceStatus	11		BOOL		1 Bit
	Training	Boolean	DeviceStatus	12		BOOL		1 Bit
	TrainingComplete	Boolean	DeviceStatus	13		BOOL		1 Bit
	Optimizing	Boolean	DeviceStatus	14		BOOL		1 Bit
	OptimizingComplete	Boolean	DeviceStatus	15		BOOL		1 Bit
	AutoImagePhotometryEnabled	Boolean	DeviceStatus	16		BOOL		1 Bit
	AutoImagePhotometryComplete	Boolean	DeviceStatus	17		BOOL		1 Bit
	Output1Status	Boolean	DeviceStatus	18		BOOL		1 Bit
	Output2Status	Boolean	DeviceStatus	19		BOOL		1 Bit
	BufferOverflow	Boolean	DeviceStatus	20		BOOL		1 Bit
	Reserved	-	DeviceStatus	21-31	TRUE	NA		11 Bits

	Fault Code	**Unsigned32**						**4 Bytes**
32 Bit Boundary	CommandErrorDetected	Boolean	FaultCode	0		BOOL		1 Bit
	CommunicationError	Boolean	FaultCode	1		BOOL		1 Bit
	FlashSectorUnprotectedFailure	Boolean	FaultCode	2		BOOL		1 Bit
	HostPortBufferOverflow	Boolean	FaultCode	3		BOOL		1 Bit
	Reserved	Boolean	FaultCode	4 - 31	TRUE	NA		28 Bits
	Counters							**24 Bytes**
32 Bit Boundary	NoReadReadCycleCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
32 Bit Boundary	MismatchPerReadcycleCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
32 Bit Boundary	NoreadCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
32 Bit Boundary	TriggerCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
32 Bit Boundary	MatchCodeCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
32 Bit Boundary	MismatchCounter	**Unsigned32**	Counters	0 - 31		Decimal		4 Bytes
	ReadCycleReport							**8 Bytes**
32 Bit Boundary	CaptureTime	**Unsigned16**	ReadCycleReport	0 - 15		Decimal		2 Bytes
	TotalDecodeTime	**Unsigned16**	ReadCycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	TotalReadCycleTime	**Unsigned16**	ReadCycleReport	0 - 15		Decimal		2 Bytes
	Reserved	**Unsigned16**	ReadCycleReport	0 - 15	TRUE	NA		2 Bytes
	Decode1CycleReport							**16 Bytes**
32 Bit Boundary	DecodeLocationTop	**Unsigned16**	Decode1CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationLeft	**Unsigned16**	Decode1CycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	DecodeLocationHeight	**Unsigned16**	Decode1CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationWidth	**Unsigned16**	Decode1CycleReport	0 - 15		Decimal		2 Bytes
	Code1Type (Subset)	**Unsigned32**	Decode1CycleReport					4 Bytes
32 Bit Boundary	AztecCode	Boolean	Code1Type	0		BOOL		1 Bit
	MicroQRCode	Boolean	Code1Type	1		BOOL		1 Bit
	PostalCode	Boolean	Code1Type	2		BOOL		1 Bit
	Code39	Boolean	Code1Type	3		BOOL		1 Bit
	Codeabar	Boolean	Code1Type	4		BOOL		1 Bit
	Interleaved2of5	Boolean	Code1Type	5		BOOL		1 Bit
	UPCEAN	Boolean	Code1Type	6		BOOL		1 Bit
	Code128EAN128	Boolean	Code1Type	7		BOOL		1 Bit
	Code93	Boolean	Code1Type	8		BOOL		1 Bit
	PD417	Boolean	Code1Type	9		BOOL		1 Bit
	PharmaCode	Boolean	Code1Type	10		BOOL		1 Bit
	DataMatrix	Boolean	Code1Type	11		BOOL		1 Bit
	QRCode	Boolean	Code1Type	12		BOOL		1 Bit

	BC412	Boolean	Code1Type	13		BOOL		1 Bit
	RSS14	Boolean	Code1Type	14		BOOL		1 Bit
	RSS14LTD	Boolean	Code1Type	15		BOOL		1 Bit
	RSS14EXP	Boolean	Code1Type	16		BOOL		1 Bit
	MicroPDF	Boolean	Code1Type	17		BOOL		1 Bit
	PostalCode	Boolean	Code1Type	18		BOOL		1 Bit
	DotCode	Boolean	Code1Type	19		BOOL		1 Bit
	Reserved for future use	Boolean	Code1Type	20 - 31	TRUE	BOOL		12 Bits
32 Bit Boundary	PixelsPerElement	Float32	Decode1CycleReport	0 - 31		Decimal		4 Bytes
32 Bit Boundary	**Decode1Length**	**Unsigned32**		**0 - 31**		**Decimal**		**4 Bytes**
32 Bit Boundary	**Decode1Data**	**VisibleString**		**0 - 1280**		**ASCII**		**160 Bytes**
	Decode2CycleReport							**16 Bytes**
	DecodeLocationTop	**Unsigned16**	Decode2CycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	DecodeLocationLeft	**Unsigned16**	Decode2CycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	DecodeLocationHeight	**Unsigned16**	Decode2CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationWidth	**Unsigned16**	Decode2CycleReport	0 - 15		Decimal		2 Bytes
	Code2Type (Subset)	**Unsigned32**	Decode2CycleReport					4 Bytes
32 Bit Boundary	AztecCode	Boolean	Code2Type	0		BOOL		1 Bit
	MicroQRCode	Boolean	Code2Type	1		BOOL		1 Bit
	PostalCode	Boolean	Code2Type	2		BOOL		1 Bit
	Code39	Boolean	Code2Type	3		BOOL		1 Bit
	Codeabar	Boolean	Code2Type	4		BOOL		1 Bit
	Interleaved2of5	Boolean	Code2Type	5		BOOL		1 Bit
	UPCEAN	Boolean	Code2Type	6		BOOL		1 Bit
	Code128EAN128	Boolean	Code2Type	7		BOOL		1 Bit
	Code93	Boolean	Code2Type	8		BOOL		1 Bit
	PD417	Boolean	Code2Type	9		BOOL		1 Bit
	PharmaCode	Boolean	Code2Type	10		BOOL		1 Bit
	DataMatrix	Boolean	Code2Type	11		BOOL		1 Bit
	QRCode	Boolean	Code2Type	12		BOOL		1 Bit
	BC412	Boolean	Code2Type	13		BOOL		1 Bit
	RSS14	Boolean	Code2Type	14		BOOL		1 Bit
	RSS14LTD	Boolean	Code2Type	15		BOOL		1 Bit
	RSS14EXP	Boolean	Code2Type	16		BOOL		1 Bit
	MicroPDF	Boolean	Code2Type	17		BOOL		1 Bit
	PostalCode	Boolean	Code2Type	18		BOOL		1 Bit
	DotCode	Boolean	Code2Type	19		BOOL		1 Bit
	Reserved for future use	Boolean	Code2Type	20 - 31	TRUE	BOOL		12 Bits

32 Bit Boundary	PixelsPerElement	Float32	Decode2CycleReport	0 - 31		Decimal		4 Bytes
32 Bit Boundary	**Decode2Length**	**Unsigned32**		**0 - 31**		**Decimal**		**4 Bytes**
32 Bit Boundary	**Decode2Data**	**VisibleString**		**0 - 576**		**ASCII**		**72 Bytes**
	Decode3CycleReport							**16 Bytes**
32 Bit Boundary	DecodeLocationTop	**Unsigned16**	Decode3CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationLeft	**Unsigned16**	Decode3CycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	DecodeLocationHeight	**Unsigned16**	Decode3CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationWidth	**Unsigned16**	Decode3CycleReport	0 - 15		Decimal		2 Bytes
	Code3Type (Subset)	**Unsigned32**	Decode3CycleReport					4 Bytes
32 Bit Boundary	AztecCode	Boolean	Code3Type	0		BOOL		1 Bit
	MicroQRCode	Boolean	Code3Type	1		BOOL		1 Bit
	PostalCode	Boolean	Code3Type	2		BOOL		1 Bit
	Code39	Boolean	Code3Type	3		BOOL		1 Bit
	Codeabar	Boolean	Code3Type	4		BOOL		1 Bit
	Interleaved2of5	Boolean	Code3Type	5		BOOL		1 Bit
	UPCEAN	Boolean	Code3Type	6		BOOL		1 Bit
	Code128EAN128	Boolean	Code3Type	7		BOOL		1 Bit
	Code93	Boolean	Code3Type	8		BOOL		1 Bit
	PD417	Boolean	Code3Type	9		BOOL		1 Bit
	PharmaCode	Boolean	Code3Type	10		BOOL		1 Bit
	DataMatrix	Boolean	Code3Type	11		BOOL		1 Bit
	QRCode	Boolean	Code3Type	12		BOOL		1 Bit
	BC412	Boolean	Code3Type	13		BOOL		1 Bit
	RSS14	Boolean	Code3Type	14		BOOL		1 Bit
	RSS14LTD	Boolean	Code3Type	15		BOOL		1 Bit
	RSS14EXP	Boolean	Code3Type	16		BOOL		1 Bit
	MicroPDF	Boolean	Code3Type	17		BOOL		1 Bit
	Composite	Boolean	Code3Type	18		BOOL		1 Bit
	DotCode	Boolean	Code3Type	19		BOOL		1 Bit
	Reserved for future use	Boolean	Code3Type	20 - 31	TRUE	BOOL		12 Bits
32 Bit Boundary	PixelsPerElement	Float32	Decode3CycleReport	0 - 31		Decimal		4 Bytes
32 Bit Boundary	**Decode3Length**	**Unsigned32**		**0 - 31**		**Decimal**		**4 Bytes**
32 Bit Boundary	**Decode3Data**	**VisibleString**		**0 - 576**		**ASCII**		**72 Bytes**
	Decode4CycleReport							**16 Bytes**
32 Bit	DecodeLocationTop	**Unsigned16**	Decode4CycleReport	0 - 15		Decimal		2 Bytes

Boundary	DecodeLocationLeft	**Unsigned16**	Decode4CycleReport	0 - 15		Decimal		2 Bytes
32 Bit Boundary	DecodeLocationHeight	**Unsigned16**	Decode4CycleReport	0 - 15		Decimal		2 Bytes
	DecodeLocationWidth	**Unsigned16**	Decode4CycleReport	0 - 15		Decimal		2 Bytes
	Code4Type (Subset)	**Unsigned32**	Decode4CycleReport					4 Bytes
32 Bit Boundary	AztecCode	Boolean	Code4Type	0		BOOL		1 Bit
	MicroQRCode	Boolean	Code4Type	1		BOOL		1 Bit
	PostalCode	Boolean	Code4Type	2		BOOL		1 Bit
	Code39	Boolean	Code4Type	3		BOOL		1 Bit
	Codeabar	Boolean	Code4Type	4		BOOL		1 Bit
	Interleaved2of5	Boolean	Code4Type	5		BOOL		1 Bit
	UPCEAN	Boolean	Code4Type	6		BOOL		1 Bit
	Code128EAN128	Boolean	Code4Type	7		BOOL		1 Bit
	Code93	Boolean	Code4Type	8		BOOL		1 Bit
	PD417	Boolean	Code4Type	9		BOOL		1 Bit
	PharmaCode	Boolean	Code4Type	10		BOOL		1 Bit
	DataMatrix	Boolean	Code4Type	11		BOOL		1 Bit
	QRCode	Boolean	Code4Type	12		BOOL		1 Bit
	BC412	Boolean	Code4Type	13		BOOL		1 Bit
	RSS14	Boolean	Code4Type	14		BOOL		1 Bit
	RSS14LTD	Boolean	Code4Type	15		BOOL		1 Bit
	RSS14EXP	Boolean	Code4Type	16		BOOL		1 Bit
	MicroPDF	Boolean	Code4Type	17		BOOL		1 Bit
	Composite	Boolean	Code4Type	18		BOOL		1 Bit
	DotCode	Boolean	Code4Type	19		BOOL		1 Bit
	Reserved for future use	Boolean	Code4Type	20 - 31	TRUE	BOOL		12 Bits
32 Bit Boundary	PixelsPerElement	Float32	Decode4CycleReport	0 - 31		Decimal		4 Bytes
32 Bit Boundary	**Decode4Length**	**Unsigned32**		**0 - 31**		**Decimal**		**4 Bytes**
32 Bit Boundary	**Decode4Data**	**VisibleString**		**0 - 576**		**ASCII**		**72 Bytes**

3.5.6 Input N Decode (MicroHAWK→PLC)

Designed to include any number of decode symbols, this data block offers the most flexibility. In the read cycle data will contains the Read Cycle Report and the Decode Cycle Report with the decode data. Where this differs from the Input 1 Decode and Input 4 Decode is that in the Read cycle report will contain how many decode symbols where found, how many decode cycle reports are contained in the read cycle data and the offset for each decode cycle report. The user then go to the offset and read the decode cycle report and the decode data at that specific location and perform any action that needs to be done. (For instance move the data to a structure for the PLC program to use).

NOTE: This input block must use the Output Premier to function correctly

3.5.6.1 Input N Decode Table

SHORT DESCRIPTION	SIZE (BYTES)
INFO BITS	1
DIAGNOSTIC SEQUENCE COUNT	1
CONFIGURATION SEQ. COUNT	1
RESERVED	1
DEVICE STATUS	4
FAULT	4
COUNTERS	24
READ CYCLE REPORT STATIC MEMBERS	8
RAW INPUT DATA	456

Total Size: 500 Bytes

3.5.6.2 Input N Decode Description

This sub section will describe the tag and each field related for the Input N Decode data block.

3.5.6.2.1 Input N Decode Module Header

The following header is used at the beginning of the input (produced) data block. Definitions for the members are included below.

3.5.6.2.1.1 Info Bits

Bit field of the input module status

INFO BIT FIELD	
BIT RUNMODE	0
BIT CONNECTIONFAULTED	1
BIT DIAGNOSTICACTIVE	2
RESERVED	3-7

3.5.6.2.1.1.1 *Run Mode*

0 = not Run Mode, 1 = Run Mode

3.5.6.2.1.1.2 *Connection Faulted*

Connection to the target is 0 = up and working, 1 = not connected. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.

3.5.6.2.1.1.3 *Diagnostic Active*

0 = No diagnostics active, 1 = One or more diagnostic or prognostics thresholds reached

Note: “Diagnostic” means a detected condition that prevents the primary signal from propagating from a sensor to the controller, or from the controller to an actuator.

3.5.6.2.1.2 Diagnostic Sequence Count

SHORT NAME	**SIZE**
DIAGNOSTIC SEQUENCE COUNT	SINT

Increments for each time a distinct diagnostic condition is detected, and also each time a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.

3.5.6.2.1.3 Configuration Change Detection

When a change in the working set has been detected by the device this bit will be set to 1. This means that the configuration in the project no longer matches the configuration in the device.
Any forward open sets this value back to 0.

3.5.6.2.2 Device Status

This tag describes the current state of the device. In table 1.2.1 the bit field is mapped to allow the user to know what state the device is in.

3.5.6.2.2.1 Device Status Bit Field

DEVICE STATUS

BIT FIELD	Status
0	Online
1	Trigger Acknowledge
2	Exposure Done
3	Decoding
4	Data Is Ready
5	Read Cycle Pass
6	Read Cycle Fail
7	General Fault
8	New match code acknowledged
9	Match Code Enabled
10	Image Sensor Calibrating
11	Image Sensor Calibration Complete
12	Training
13	Training Complete
14	Optimizing
15	Optimization Complete
16	AutoImage Photometry Enabled
17	AutoImage Photometry Complete
18	Output1 Status
19	Output2 Status
20	Output3 Status
21	Buffer Overflow
22-31	Reserved

3.5.6.2.2.2 Online

The units Current Read Cycle State

state

0 = Read cycle is disabled thus the unit is offline but the unit can receive commands. There is no data produced in the Input data block and no data is consumed in the Output data block when in this state.

1 = Read Cycle is enabled and the unit can be triggered and data is available for consumption and the unit will consume output data.

3.5.6.2.2.3 Trigger Acknowledged

This bit will go high when the unit has accepted the Trigger command in the Control tag. The user must lower the Trigger bit in the control tag in order for this bit to go back 0.

3.5.6.2.2.4 Exposure Done

When the image sensor exposure is complete this bit will go high and the user can move the object in the Field of view for the next image to be taken.

3.5.6.2.2.5 Decoding

When the unit is processing the image, this bit will be high. When the unit has completed the image process this bit will go low.

3.5.6.2.2.6 Data is Ready

The Read Cycle and Data Cycle Reports are ready for consumption when this bit goes high.

3.5.6.2.2.7 Read Cycle Pass

If the read cycle has passed all criteria, this bit will go high. It will go low when the ready begins to process the next image.

3.5.6.2.2.8 Ready Cycle Fail

If the read cycle has failed any of the criteria that was programmed, this bit will go high. It will go low when the ready begins to process the next image.

3.5.6.2.2.9 General Fault

When a fault occurs in the unit, this bit will go high. The user can reference the Fault Code tag for the error code and must remedy the problem. After the problem has been resolved the user can reset the fault in the Control tag in the Output data block.

3.5.6.2.2.10 New Match Code Acknowledge

When active the unit has accepted the data read on the last trigger as the new match code. User shall set the Learn New Match Code bit in the Control tag to zero when this bit goes high.

3.5.6.2.2.11 Match Code Enabled

When this bit is 1 the unit will use the Match Code function to determine the Inspection Results.

3.5.6.2.2.12 Image Sensor Calibrating

The unit is undergoing a calibration on one or all of the following:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

When the unit has completed calibration this bit will be set to zero.

3.5.6.2.2.13 Image Sensor Calibration Complete

The unit has completed calibrating the image sensor for one or all of the following items:

- Exposure
- Gain
- Focus (If the unit has Auto focus capabilities)

The user shall set the Control bit Calibration Image Sensor to zero if they have not done so already.

3.5.6.2.2.14 Training

When the unit is in the training process, this bit will be set to one. After the training process has completed, this bit will be set to zero.

3.5.6.2.2.15 Training Complete

After the unit has completed the training process, this bit will be set to one. If the user has set the Train Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.6.2.2.16 Optimizing

When the unit is optimizing this bit will be set to one. After optimization has completed, this bit will be set to zero.

3.5.6.2.2.17 Optimization Complete

After the unit has completed the optimization process, this bit will be set to one. If the user has set the Optimize Unit bit in the Control Tag, they shall set it back to zero. If an error has occurred, the Fault Code Tag will display the error.

3.5.6.2.2.18 AutoImage Photometry Enabled

The unit will use AutoImage Photometry when trying to decode the symbol. Disabling this will mean the unit is using fixed values for Exposure, Gain and (if applicable) focal distance.

3.5.6.2.2.19 AutoImage Photometry Complete

This value will be set to one after the unit has completed an AutoImage Photometry calibration.

3.5.6.2.2.20 Output 1 Status

Current status of the physical output 1 signal

3.5.6.2.2.21 Output 2 Status

Current status of the physical output 2 signal

3.5.6.2.2.22 Output 3 Status

Current status of the physical output 3 signal

3.5.6.2.2.23 Buffer Overflow

When the data in the input buffer exceeds the buffer size (456 bytes) then this bit will go high alerting the user that the data is an incomplete segment.

3.5.6.2.3 Fault Code

This tag shall display the fault codes when the unit has faulted for any commands sent to it. When the user issues the Reset Fault in the Control Tag, this value will be set to zero.

3.5.6.2.3.1 Fault Code Bit Field

COUNTERS	
COMMAND ERROR DETECTED	0
COMMUNICATION ERROR	1
FLASH SECTOR UNPROTECTED FAILURE	2
HOST PORT BUFFER OVERFLOW	3
RESERVED FOR FUTURE EXPANSION	4-31

3.5.6.2.4 Counters

Displays the counters stored in the unit upon power up or after a configuration change. These counters can be reset via the output command tag.

3.5.6.2.4.1 Counters Table

COUNTERS	
NOREAD READCYCLE COUNTER	DINT
MISMATCH PER READCYCLE COUNTER	DINT
NOREAD COUNTER	DINT
TRIGGER COUNTER	DINT
MATCH CODE COUNTER	DINT
MISMATCH COUNTER	DINT

NOTE: Time starts over with power on but not with a <A> or <Z> type reset.

3.5.6.2.4.2 NoRead Cycle Counter

The message displays the total number of noread read cycles that have occurred since power-on or the last Noread Read cycle Counter Reset command

3.5.6.2.4.3 MisMatch Per ReadCycle Counter

The message displays the total number of mismatched code pre readcycle that have occurred since power-on or the last Mismatch per Readcycle Counter Reset command

3.5.6.2.4.4 NoRead Counter

The message displays the total number of noreads that have occurred since power-on or the last Noread Counter Reset command

3.5.6.2.4.5 Trigger Counter

The message displays the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command

3.5.6.2.4.6 MatchCode Counter

The message displays either (1) the total number of good reads that match the master label or (2) the total number of good reads, or decodes. The count begins from the last power-on or Match Code/Good Read Counter Reset command. To count the good reads that match the master label, enable Match Code; to count good reads only, disable Match Code

3.5.6.2.4.7 Mismatch Counter

The message displays the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command

3.5.6.2.5 Read Cycle Data

Due to there being more than 1 Decode Report the read cycle data is grouped into a 460 byte data field. The user shall use the Read Cycle Report to determine how many Decodes were found and the Decode Report offsets for each decoded symbol found in the Read Cycle.

3.5.6.2.5.1 Read Cycle Report

Information regarding the read cycle. The difference in this Input data block is the variable length in this field. The user can reference the Offset of each report found, which is indicted in the tag Number of decode reports. Each Decode Cycle Report will have an offset to indicate to the user where to unpack the data in the data block. The decode report is the same as in the Input Data block for 1 decode symbol.

3.5.6.2.5.1.1 Read Cycle Report Table

SHORT DESCRIPTION	SIZE
CAPTURE TIME	INT
TOTAL DECODE TIME	INT
TOTAL READCYCLE TIME	INT
NUMBER OF DECODES IN READ CYCLE	SINT
NUMBER OF DECODE REPORTS	SINT
OFFSET OF REPORT 1	DINT
OFFSET OF REPORT 2	DINT
…	…
OFFSET OF REPORT N	DINT

3.5.6.2.5.1.2 Capture Time

Total time it tool to capture the image

3.5.6.2.5.1.3 Total Decode Time

Total time spent decoding the symbol(s)

3.5.6.2.5.1.4 Total ReadCycle Time

Total Time Spent decoding the symbol which is the sum of the Capture, Decode and Overhead time.

3.5.6.2.5.1.5 Number of Decodes in Read Cycle

The total number of decoded symbols found during the read cycle

3.5.6.2.5.1.6 Number of Decode Reports

The total number of reports associated with the decode symbols. This will match the total number of symbols found in the ready cycle.

3.5.6.2.5.1.7 Offset of Report (n)

The offset value in bytes, where the Decode Cycle Report is located in the Read Cycle Data array. The offset of report 1 will always be 8, meaning that the user always read byte 8 in the Read Cycle Report to locate the Decode Cycle Report 1. (See figure below)

Byte	0	1	2	3	4	5	6	7	8	…	n
Item	Capture Time		Total Decode Time		Total Read Cycle Time		Number of Decodes in Read Cycle	Number of Decode Cycle Report	Offset of Report 1	…	Offset of Report n

3.5.6.2.6 Decode Cycle Report

Information on the decoded symbol

3.5.6.2.6.1 Decode Cycle Report Table

DESCRIPTOIN	SIZE
DECODE LOCATION TOP	INT
DECODE LOCATION LEFT	INT
DECODE LOCATION HEIGHT	INT
DECODE LOCATION WIDTH	INT
CODE TYPE	DINT
PIXELS PER ELEMENT	REAL

3.5.6.2.6.2 Decode Location Top

Defines the row position of the upper-left starting point of the image window.

3.5.6.2.6.3 Decode Location Left

Defines the column position of the upper-left starting point of the image window.

3.5.6.2.6.4 Decode Location Height

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.6.2.6.5 Decode Location Width

Defines the size, in rows, of the image window. Maximum value is defined as the Maximum row size of Image sensor, minus the row pointer value.

3.5.6.2.6.6 Code Type

Bit field of the symbol in that was decoded for this report

3.5.6.2.6.6.1 Code Type Bit Map

SYMBOLOGY	
AZTEC CODE	0
MICROQRCODE	1
POSTAL CODE	2
CODE 39	3
CODEABAR	4
INTERLEAVED 2 OF 5	5
UPC/EAN	6
CODE 128/EAN 128	7
CODE 93	8
PD417	9
PHARMACODE	10
DATAMATRIX	11
QRCODE	12
BC412	13
RSS-14	14
RSS-14 LTD	15
RSS-14 EXP	16
MICROPDF	17
POSTAL CODE	18
DOTCODE	19
RESERVED FOR FUTURE USE	20
RESERVED FOR FUTURE USE	21
RESERVED FOR FUTURE USE	22
RESERVED FOR FUTURE USE	23
RESERVED FOR FUTURE USE	24
RESERVED FOR FUTURE USE	25
RESERVED FOR FUTURE USE	26
RESERVED FOR FUTURE USE	27
RESERVED FOR FUTURE USE	28
RESERVED FOR FUTURE USE	29
RESERVED FOR FUTURE USE	30
RESERVED FOR FUTURE USE	31

3.5.6.2.6.7 Pixels Per Element

The number of pixels for each element, either dark or light for both x and y directions

3.5.6.2.6.8 Decode Length

The number of characters found in the decode string

3.5.6.2.6.9 Decode Data

Outputted decode data from the unit with one difference. Preamble and post amble symbols are not added.

3.5.6.3 Input N Decode Member Location

The following table is where members for the Input N Decode data block are located.

3.5.6.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Style	Data Length	Byte Offset
	InfoBits	**Unsigned32**				**1 Byte**	0
32 Bit Boundary	BIT RunMode	Boolean	InfoBits	0	NA	1 Bit	
	BIT ConnectionFaulted	Boolean	InfoBits	1	NA	1 Bit	
	BIT DiagnosticActive	Boolean	InfoBits	2	NA	1 Bit	
	Reserved	Boolean	InfoBits	3 - 7	NA	5 Bits	0
	DiagnosticSequenceCount	**Unsigned8**			**Decimal**	**1Byte**	1
	ConfigurationChangeDetect	**Unsigned8**				**1 Byte**	2
	ConfigChangeDetect	**Unsigned8**	ConfigurationChangeDetect	0	BOOL	1 Bit	
	Reserved	**Unsigned8**	ConfigurationChangeDetect	1 - 7	NA	7 Bits	
	Reserved	**Unsigned8**			**NA**	**1 Byte**	3
	DeviceStatus	**Unsigned32**				**4 Bytes**	4
32 Bit Boundary	Online	Boolean	DeviceStatus	0	BOOL	1 Bit	
	TriggerAcknowledge	Boolean	DeviceStatus	1	BOOL	1 Bit	
	ExposureDone	Boolean	DeviceStatus	2	BOOL	1 Bit	
	Decoding	Boolean	DeviceStatus	3	BOOL	1 Bit	
	DataIsReady	Boolean	DeviceStatus	4	BOOL	1 Bit	
	ReadCyclePass	Boolean	DeviceStatus	5	BOOL	1 Bit	
	ReadCycleFail	Boolean	DeviceStatus	6	BOOL	1 Bit	
	GeneralFault	Boolean	DeviceStatus	7	BOOL	1 Bit	
	NewMatchCodeAcknowledged	Boolean	DeviceStatus	8	BOOL	1 Bit	
	MatchCodeEnabled	Boolean	DeviceStatus	9	BOOL	1 Bit	
	ImageSensorCalibrating	Boolean	DeviceStatus	10	BOOL	1 Bit	
	ImageSensorCalibrationComplete	Boolean	DeviceStatus	11	BOOL	1 Bit	

	Training	Boolean	DeviceStatus	12	BOOL	1 Bit	
	TrainingComplete	Boolean	DeviceStatus	13	BOOL	1 Bit	
	Optimizing	Boolean	DeviceStatus	14	BOOL	1 Bit	
	OptimizingComplete	Boolean	DeviceStatus	15	BOOL	1 Bit	
	AutoImagePhotometryEnabled	Boolean	DeviceStatus	16	BOOL	1 Bit	
	AutoImagePhotometryComplete	Boolean	DeviceStatus	17	BOOL	1 Bit	
	Output1Status	Boolean	DeviceStatus	18	BOOL	1 Bit	
	Output2Status	Boolean	DeviceStatus	19	BOOL	1 Bit	
	BufferOverflow	Boolean	DeviceStatus	20	BOOL	1 Bit	
	Reserved	-	DeviceStatus	21-31	NA	11 Bits	
	Fault Code	**Unsigned32**				**4 Bytes**	8
32 Bit Boundary	CommandErrorDetected	Boolean	FaultCode	0	BOOL	1 Bit	
	CommunicationError	Boolean	FaultCode	1	BOOL	1 Bit	
	FlashSectorUnprotectedFailure	Boolean	FaultCode	2	BOOL	1 Bit	
	HostPortBufferOverflow	Boolean	FaultCode	3	BOOL	1 Bit	
	Reserved	Boolean	FaultCode	4 - 31	NA	28 Bits	
	Counters					**24 Bytes**	8
32 Bit Boundary	NoReadReadCycleCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	12
32 Bit Boundary	MismatchPerReadcycleCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	16
32 Bit Boundary	NoreadCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	20
32 Bit Boundary	TriggerCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	24
32 Bit Boundary	MatchCodeCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	28
32 Bit Boundary	MismatchCounter	**Unsigned32**	Counters	0 - 31	Decimal	4 Bytes	32
	ReadCycleReport					**8 Bytes**	
32 Bit Boundary	CaptureTime	**Unsigned16**	ReadCycleReport	0 - 15	Decimal	2 Bytes	36
	TotalDecodeTime	**Unsigned16**	ReadCycleReport	0 - 15	Decimal	2 Bytes	38
32 Bit Boundary	TotalReadCycleTime	**Unsigned16**	ReadCycleReport	0 - 15	Decimal	2 Bytes	40
	NumberofDecodesInReadCycle	**Unsigned8**	ReadCycleReport	0 - 7		1 Byte	41
	NumberofDecodeReports	**Unsigned8**	ReadCycleReport	0 - 7		1 Byte	42
	RAWInputData	**Unsigned8**				**16 Bytes**	44

RawData	**Unsigned8**	RAWInputData	0 - 3647	HEX	456 Bytes

3.6 Output Modules

This section will go over all the output modules for the MicroHAWK. Only one output module is allowed and each output module varies in size and functionality to allow flexibility between controllers. Please note that the output module must be paired with the correct intput module to function properly.

3.6.1 Output Legacy

The section describes the output assembly for the Ethernet/IP Communications for the MicroHAWK. All output commands will issue the targeted event in the unit and will be echoed in the input data block when the unit has responded and issued the event successfully. All parameter changes made on the next read cycle.

3.6.1.1 Output Legacy Table

SHORT DESCRIPTION	PLC DATA TYPE	SIZE (BYTES)
USER DEFINED TAGS	DINT	4
COMMANDS	DINT	4
EXTERNAL OUTPUT	DINT	4

Total Size: 12 Bytes

3.6.1.2 Output Legacy Description

This sub section will describe the tag and each field related to the Output Legacy data block.
This module must be paired with one of the following input modules

- Input Small Legacy
- Input Big Legacy

3.6.1.2.1 User Defined Tags

This provides the PLC programmer a method of uniquely identifying multiple readers in the system. This field serves no functional purpose in the MicroHAWK. The value sent by the PLC for this field is echoed back to the input assemblies.

3.6.1.2.2 Commands

The section describes the commands that can be outputted to the unit. The unit will respond to a successful acknowledgment and execution in the input data block.

3.6.1.2.2.1 Command Bit Field

BIT FIELD	COMMAND
0	Trigger
1	New Master
2	Buffer Overflow
3-7	Reserved
8	Disable Scanning
9-15	Reserved
16	Clear Read Cycle Report and Counters
17	Unlatch Outputs
18-31	Reserved

3.6.1.2.2.2 Trigger

Edge event-driven. Takes effect when read mode is Serial, Edge, or Level. A transition from 0 to 1 is a rising edge trigger event. A transition from 1 to 0 is a falling edge trigger event. The following sources all induce trigger events in the reader, including:

- A serial command from a serial com port
- EZ button
- External Trigger input signal on connector A
- Command: Trigger bit in the OUT data block

If the reader is to be exclusively triggered by the PLC, then all other trigger sources must be kept idle

3.6.1.2.2.3 New Master

Edge-event driven. A transition from 0 to 1 is a command to the unit similar to sending the <G> serial command, or activating the New Master input on connector A. When activated, the New Master function instructs the reader to store the next decode in the master symbol database.

3.6.1.2.2.4 Disable Scanning

Operates the same as the <H> and <I> commands. A transition from 0 to 1 is the same as sending an <I> command, which issues a "disable" event. A transition from 1 to 0 is the same thing as sending an <H> command, which issues an "enable" event. Note that the most recent command, either <H> or <I> serial commands or the Camera Action:DisableScanning command will always override the previous "scanning disable" state. To verify scanning status, observe the DeviceStatus field in asm 0x65.

3.6.1.2.2.5 Clear Read Cycle Report and Counters

Trigger, Decode/Match, Mismatch, Noread, Decoded Data string, and Sequence. A transition from 0 to 1 is similar to sending the commands <U><W><Y><O>, which clear the historical read cycle counters. Also, the Sequence counter and Decoded Data string will go to 0. Note that if this command is received while a read cycle is active, execution of the command will be delayed until the read cycle has ended, and the read cycle's information will probably be lost.

3.6.1.2.2.6 Unlatch Outputs

If any outputs are configured for "Unlatch on Input1", a transition from 0 to 1 will unlatch the output. See configuration commands K810-812. It is not necessary for Input 1 to be enabled.

3.6.1.2.3 External Output

This sub section details the External Output bit field for the Output Data block

BIT FIELD	PIN NAME
0	Out1
1	Out2
2	Out3
3-31	Reserved

0 = open the output contact
1 = close the output contact
Note: Not operational at this time.

3.6.1.3 Output Legacy Member Location

The following table is where members for the Output assembly are located.

3.6.1.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Style	Data Length
	User Defined Tag	**DINT**				**4 Bytes**
32 Bit Boundary	UserTag_1	Boolean	User Defined Tag	0	BOOL	1 Bit
	UserTag_2	Boolean	User Defined Tag	1	BOOL	1 Bit
	UserTag_3	Boolean	User Defined Tag	2	BOOL	1 Bit
	UserTag_4	Boolean	User Defined Tag	3	BOOL	1 Bit
	UserTag_5	Boolean	User Defined Tag	4	BOOL	1 Bit
	UserTag_6	Boolean	User Defined Tag	5	BOOL	1 Bit
	UserTag_7	Boolean	User Defined Tag	6	BOOL	1 Bit
	UserTag_8	Boolean	User Defined Tag	7	BOOL	1 Bit
	UserTag_9	Boolean	User Defined Tag	8	BOOL	1 Bit
	UserTag_10	Boolean	User Defined Tag	9	BOOL	1 Bit
	UserTag_11	Boolean	User Defined Tag	10	BOOL	1 Bit
	UserTag_12	Boolean	User Defined Tag	11	BOOL	1 Bit
	UserTag_13	Boolean	User Defined Tag	12	BOOL	1 Bit
	UserTag_14	Boolean	User Defined Tag	13	BOOL	1 Bit
	UserTag_15	Boolean	User Defined Tag	14	BOOL	1 Bit
	UserTag_16	Boolean	User Defined Tag	15	BOOL	1 Bit
	UserTag_17	Boolean	User Defined Tag	16	BOOL	1 Bit
	UserTag_18	Boolean	User Defined Tag	17	BOOL	1 Bit
	UserTag_19	Boolean	User Defined Tag	18	BOOL	1 Bit
	UserTag_20	Boolean	User Defined Tag	19	BOOL	1 Bit
	UserTag_21	Boolean	User Defined Tag	20	BOOL	1 Bit
	UserTag_22	Boolean	User Defined Tag	21	BOOL	1 Bit
	UserTag_23	Boolean	User Defined Tag	22	BOOL	1 Bit
	UserTag_24	Boolean	User Defined Tag	23	BOOL	1 Bit
	UserTag_25	Boolean	User Defined Tag	24	BOOL	1 Bit
	UserTag_26	Boolean	User Defined Tag	25	BOOL	1 Bit
	UserTag_27	Boolean	User Defined Tag	26	BOOL	1 Bit
	UserTag_28	Boolean	User Defined Tag	27	BOOL	1 Bit
	UserTag_29	Boolean	User Defined Tag	28	BOOL	1 Bit
	UserTag_30	Boolean	User Defined Tag	29	BOOL	1 Bit
	UserTag_31	Boolean	User Defined Tag	30	BOOL	1 Bit
	UserTag_32	Boolean	User Defined Tag	31	BOOL	1 Bit
	Commands	**DINT**				**4 Bytes**

32 Bit Boundary	Trigger	Boolean	Commands	0	BOOL	1 Bit
	New Master	Boolean	Commands	1	BOOL	1 Bit
	Reserved for future use	Boolean	Commands	2 - 7	BOOL	6 Bits
	Disable Scanning	Boolean	Commands	8	BOOL	1 Bit
	Reserved for future use	Boolean	Commands	9 - 15	BOOL	7 Bits
	Clear Read Cycle Report and Counters	Boolean	Commands	16	BOOL	1 Bit
	Unlatch Outputs	Boolean	Commands	17	BOOL	1 Bit
	Reserved for future use	Boolean	Commands	18 - 31	BOOL	14 Bits
	External Output	**DINT**				**4 Bytes**
32 Bit Boundary	Out1	Boolean	External Output	0	BOOL	1 Bit
	Out2	Boolean	External Output	1	BOOL	1 Bit
	Out3	Boolean	External Output	2	BOOL	1 Bit
	Reserved for future use	-	External Output	3 - 31	BOOL	29 Bits

3.6.2 Output Premier

The section describes the output premier for the MicroHAWK. All output commands will issue the targeted event in the unit and will be echoed in the input data block when the unit has responded and issued the event successfully. All parameter changes made on the next read cycle.

3.6.2.1 Output Premier Table

SHORT DESCRIPTION	PLC DATA TYPE	SIZE (BYTES)
COMMANDS	DINT	4

Total Size: 4 Bytes

3.6.2.2 Output Premier Description

This sub section will describe the tag and each field related to the Output Premier data block.
This module must be paired with one of the following input modules

- Input MXL
- Input 1 Decode
- Input 4 Decode
- Input N Decode

3.6.2.2.1 Commands

The section describes the commands that can be outputted to the unit. The unit will respond to a successful acknowledgment and execution in the input data block.

3.6.2.2.1.1 Command Bit Field

BIT FIELD	COMMAND
0	Run Mode
1	Trigger
2	Enable MatchCode
3	Reset General Fault
4	Clear No Read ReadCycle Count
5	Clear MisMatch ReadCycle Count
6	Clear No Read Count
7	Clear Trigger Count
8	Clear Matchcode Count
9	Clear Mismatch Count
10	Output_1
11	Output_2
12	Output_3
13-31	Reserved for future use

3.6.2.2.1.2 Online

Ends the current read cycle, and will not allow the imager to enter another read cycle until re-enabled by changing the state from 1 to 0. This feature is useful during extended periods of time when no symbols are being decoded, or the imager is being configured. Disabling the imager will not affect any commands that have already been downloaded.

3.6.2.2.1.3 Trigger

Edge event-driven. Takes effect when read mode is Serial, Edge, or Level. A transition from 0 to 1 is a rising edge trigger event. A transition from 1 to 0 is a falling edge trigger event. The following sources all induce trigger events in the reader, including:

- A serial command from a serial com port
- EZ button
- External Trigger input signal on connector A
- Command: Trigger bit in the OUT data block

If the reader is to be exclusively triggered by the PLC, then all other trigger sources must be kept idle

3.6.2.2.1.4 Enable MatchCode

When the option is set to anything other than disabled the scanner will compare symbols read in the read cycle to master symbols in a database. The results of this comparison can be used to specify the output of the read cycle such as whether to output symbol data or change the state of the programmable outputs. Matchcode is only functional in triggered modes. Multi-symbol matchcode is supported but only with the matchcode type option set to true.

3.6.2.2.1.5 Reset General Fault

When a Fault occurs in the system, the user shall use this bit to try to reset the fault after they have remedied the problem (if applicable).

3.6.2.2.1.6 Clear Noread Readcycle Counter

Resets the total number of noread readcycles that have occurred since power-on or the last Noread Readcycle Counter Reset command to 000000000.

3.6.2.2.1.7 Clear Mismatch Readcycle Counter

Resets the total number of mismatched code pre readcycle that have occurred since power-on or the last Mismatch per Readcycle Counter Reset command to 000000000.

3.6.2.2.1.8 Clear Noread Counter

Resets the total number of noreads that have occurred since power-on or the last Noread Counter Reset command to 000000000.

3.6.2.2.1.9 Clear Trigger Counter

Resets the total number of triggers that have occurred since power-on or the last Trigger Counter Reset command to 000000000.

3.6.2.2.1.10 Clear Match Code Counter

Resets the Match Code/Good Read Counter to 000000000.

3.6.2.2.1.11 Clear Mismatch Counter

Resets the total number of symbols successfully read that do not match the master label since power-on or the last Mismatch Counter command to 000000000.

3.6.2.2.1.12 Output 1

Raises Output 1 if set to 1 and set's output 1 to 0 when this value is 0. This value can be read in the input data block in bit 19 under the device status tag.

3.6.2.2.1.13 Output 2

Raises Output 2 if set to 1 and set's output 1 to 0 when this value is 0. This value can be read in the input data block in bit 20 under the device status tag.

3.6.2.2.1.14 Output 3

Raises Output 2 if set to 1 and set's output 1 to 0 when this value is 0. This value can be read in the input data block in bit 20 under the device status tag.

3.6.2.3 *Output Premier Member Location*

The following table is where members for the Output Premier are located.

3.6.2.3.1 Member Map Table

	Member	DataType	Target	BitNumber	Style	Data Length
	Commands	**DINT**				**4 Bytes**
32 Bit Boundary	RunMode	Boolean	Commands	0	BOOL	1 Bit
	Trigger	Boolean	Commands	1	BOOL	1 Bit
	EnableMatchCode	Boolean	Commands	2	BOOL	1 Bit
	ResetGeneralFault	Boolean	Commands	3	BOOL	1 Bit
	ClearNoReadReadCycleCount	Boolean	Commands	4	BOOL	1 Bit
	ClearMisMatchReadCycleCount	Boolean	Commands	5	BOOL	1 Bit
	ClearNoReadCount	Boolean	Commands	6	BOOL	1 Bit
	ClearTriggerCount	Boolean	Commands	7	BOOL	1 Bit
	ClearMatchcodeCount	Boolean	Commands	8	BOOL	1 Bit
	ClearMismatchCount	Boolean	Commands	9	BOOL	1 Bit
	Output_1	Boolean	Commands	10	BOOL	1 Bit
	Output_2	Boolean	Commands	11	BOOL	1 Bit
	Output_3	Boolean	Commands	12	BOOL	1 Bit
	Reserved for future use	Boolean	Commands	13 - 31	BOOL	19 Bits
	Reserved	**NA**				**496 Bytes**

4 Siemens TIA Portal v13 SP1 Update 8

This section will go over the necessary steps needed to add the MicroHAWK unit to your Siemens PLC with Siemens TIA Portal v13 SP1 update 8.

4.1.1 Table 4.1.1 Hardware used in example

HARDWARE DESCRIPTION	ARTICLE NUMBER	VERSION
SIEMENS PLC CPU 1510SP-1 PN	6ES7 510-1DJ01-0AB0	V1.8
DIGITAL INPUT DI 16X24VDC ST	6ES7 131-6BH00-0BA0	V1.0
DIGITAL OUTPUT DQ 16X24VDC/0.5A ST	6ES7 132-6BH00-0BA0	V1.0

This section will go over the following:

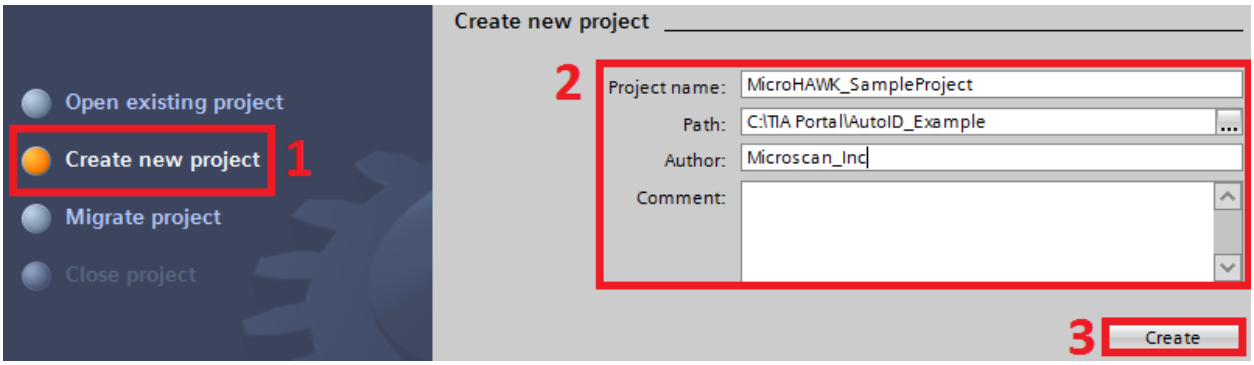
1. Starting up TIA Portal
2. Adding a Controller (This example uses the controller in Table 4.1.1)
3. Installing the MicroHAWK GSDML File
4. Adding the MicroHAWK Unit
5. Adding Input/Output Slots
6. Importing the User Data Types defined by Microscan
7. Importing the Function Blocks created by Microscan
8. Reading/Writing Data to the MicroHAWK

4.2 Starting up TIA Portal

This section assumes that TIA Portal is installed on the machine the programmer is working on. The section also assumes that this is a new project. If this is a not a new project than proceed to section 4.4 Installing the MicroHAWK GSDML file to begin adding the MicroHAWK to the project.

1. Double click the **TIA Portal V13** Icon located on the desktop

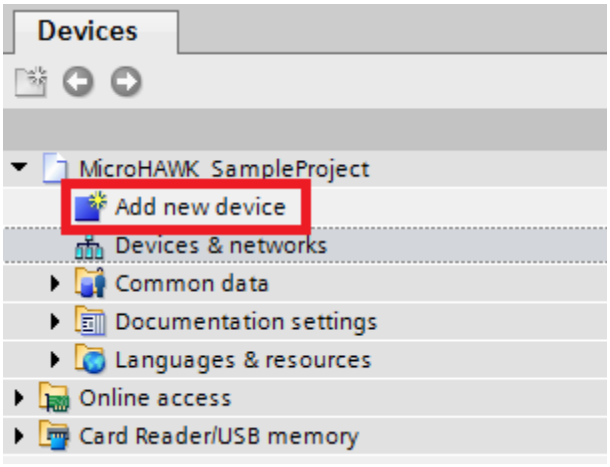
2. Click **Create New Project (1)** and give your project a **name (2).** Click **Create (3)** when done.



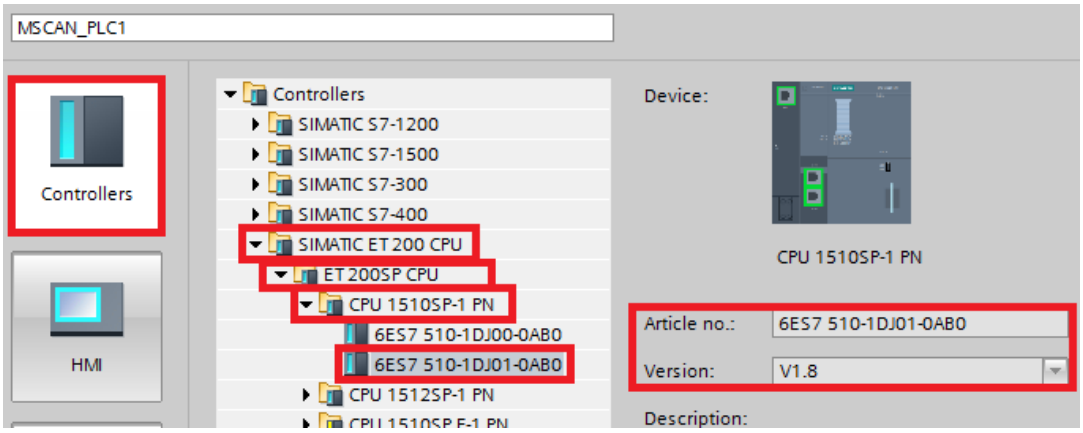
3. One the lower left hand corner select **Project View**

4.3 Adding a Controller

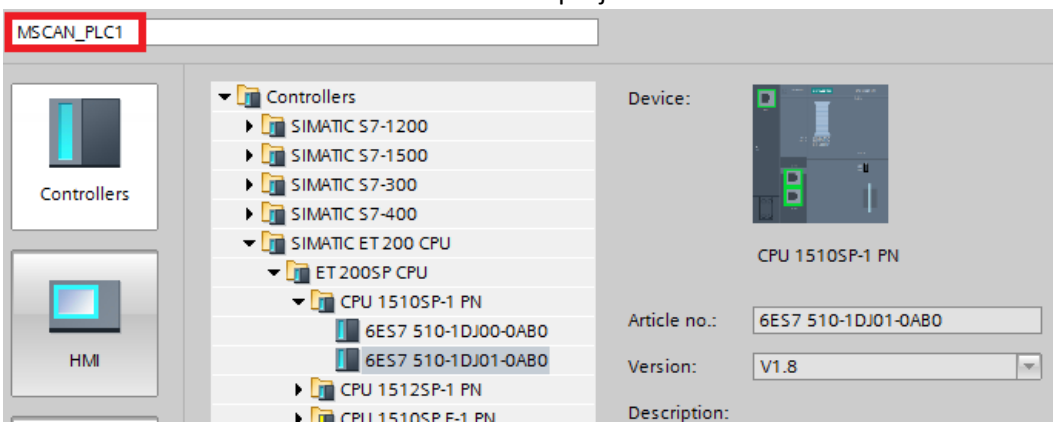
1. To add a controller double click **Add new device** in the **Devices** Panel



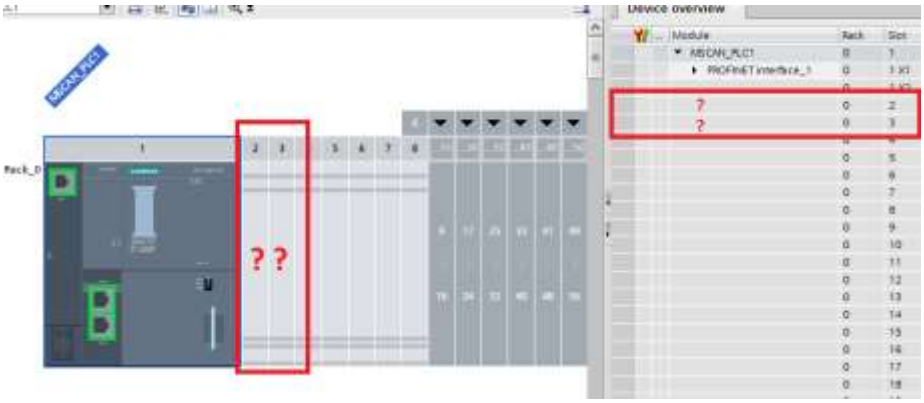
2. This example uses a Siemens ET200SP CPU. Click **Controllers → SIMATIC ET200 CPU→CPU1510SP-1** PN and find Article Number **6ES7 510-1DJ01-0AB0** and verify the Version is correct at **V1.8**



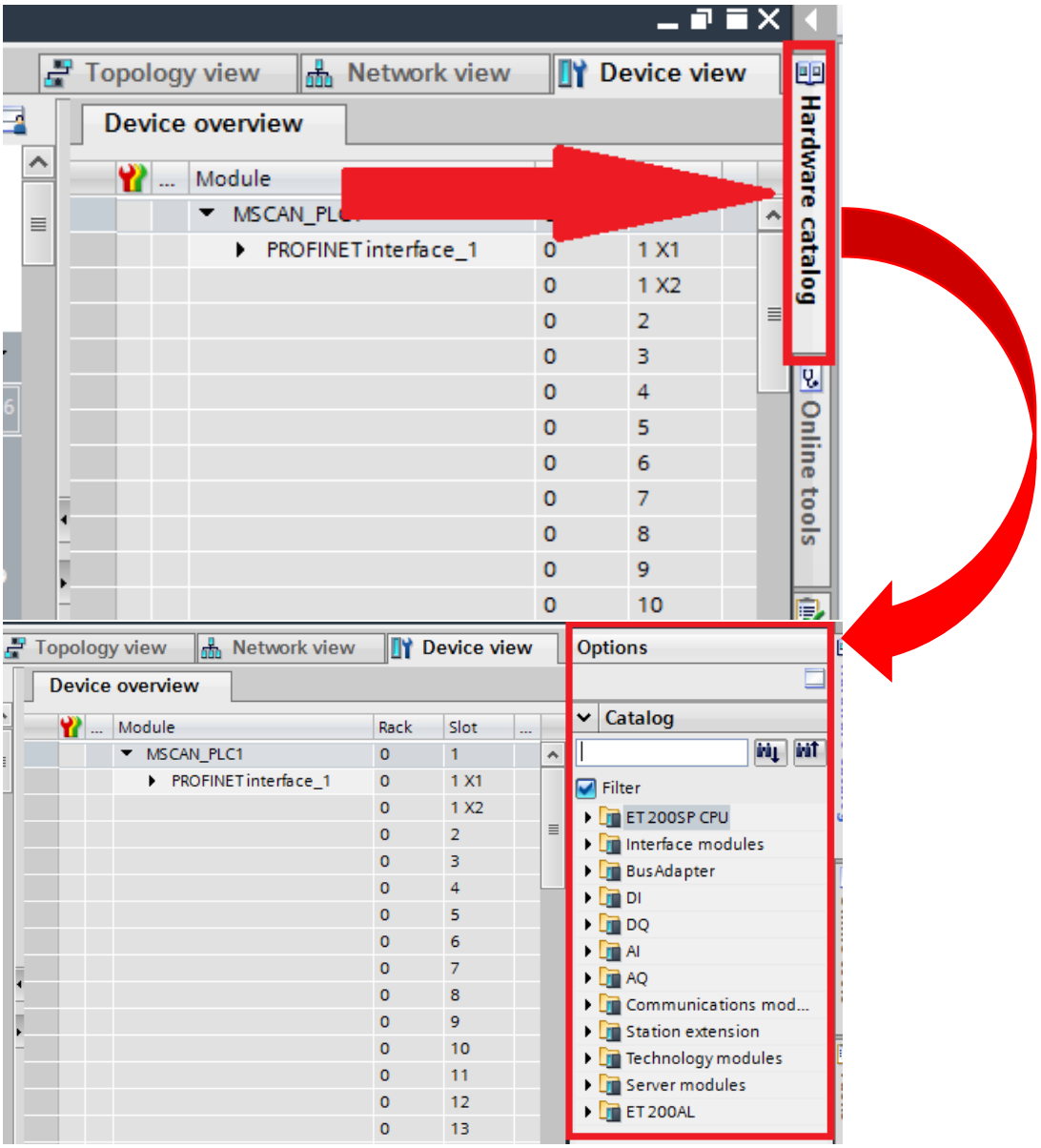
3. Give the Controller a Unique name so it does not conflict with any other ProfiNET devices on the network. Click OK to add the controller to the project.



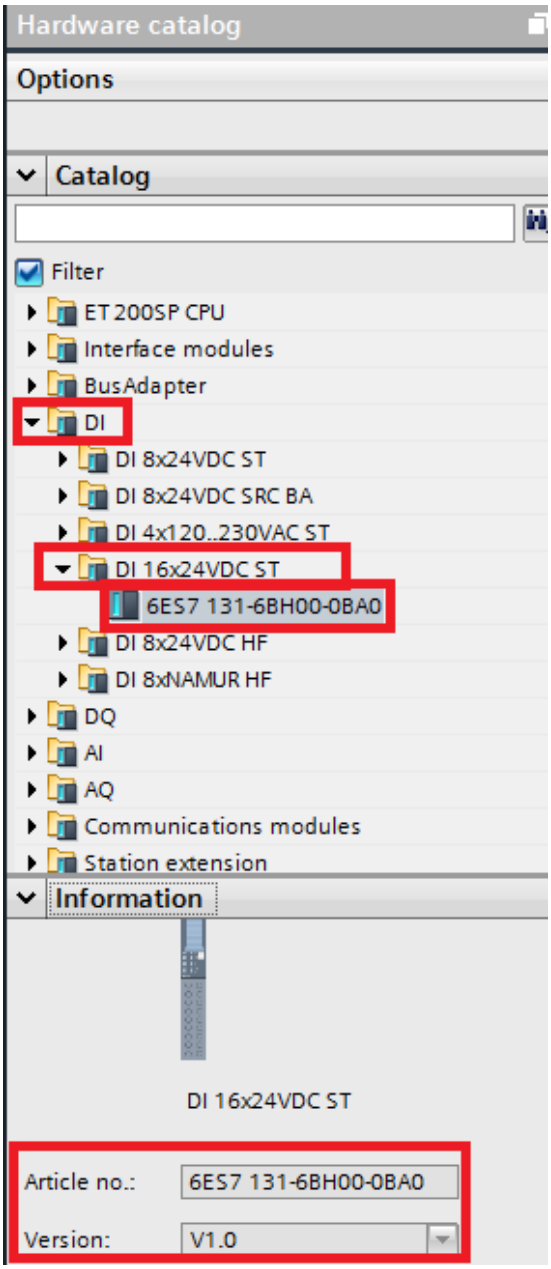
4. In this example the controller has a Digital Input Card installed into slot 2 and a Digital output Card installed in slot 3. These will need to be added to the controller since they are missing.



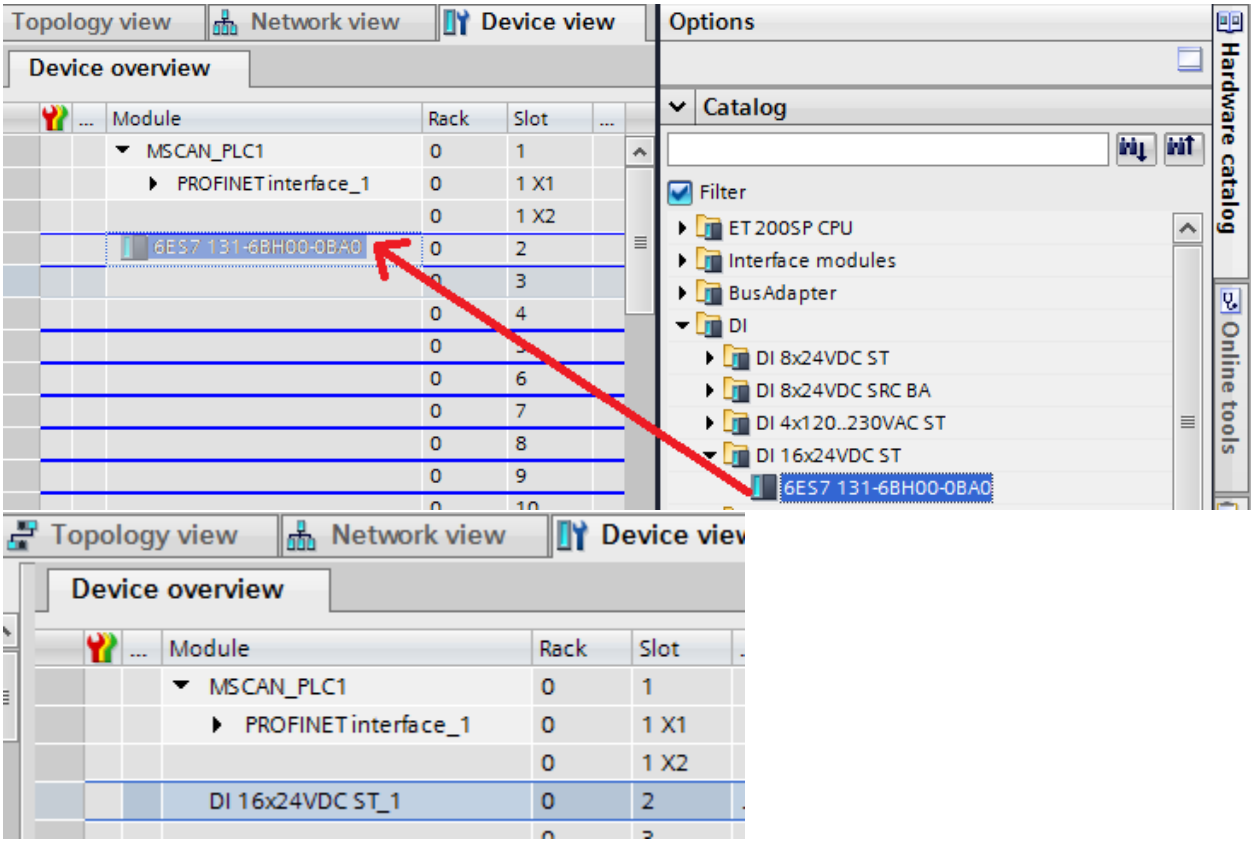
5. Click on the **Hardware catalog** tab to display the hardware that can be added to the controller.



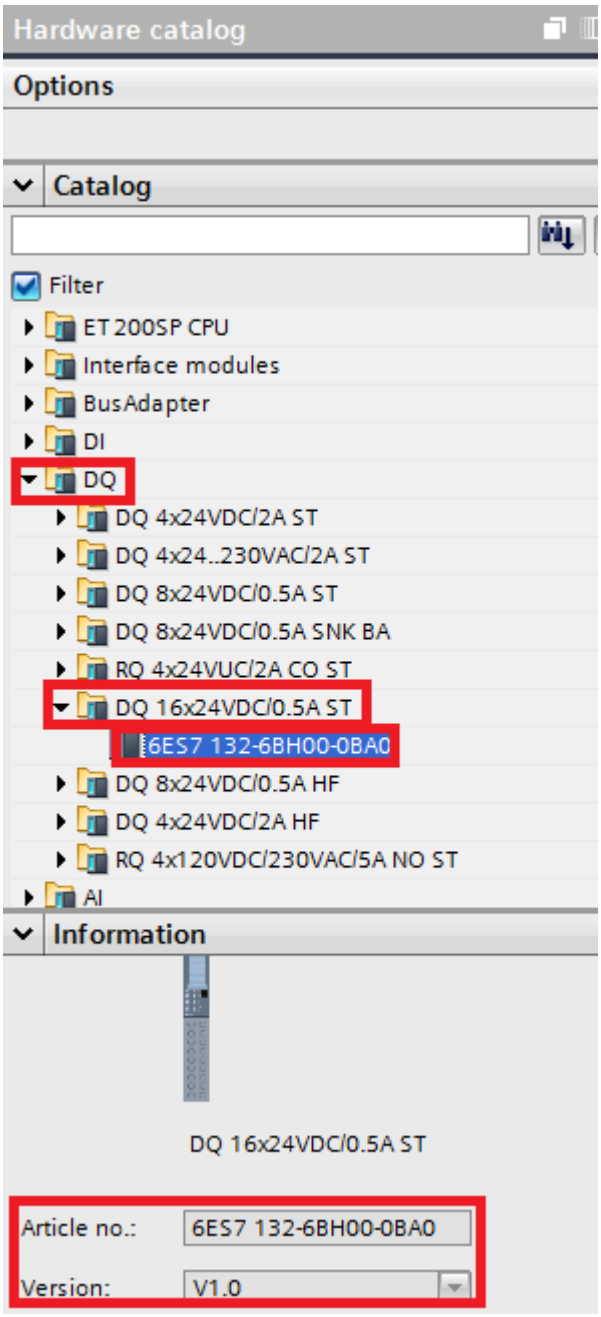
6. To add the Digital Input Card go to the **Hardware Catalog** panel go to **DI→DI 16x24VDC ST→6ES7 131-6BH00-0BA0** and verify that Version is **1.0**



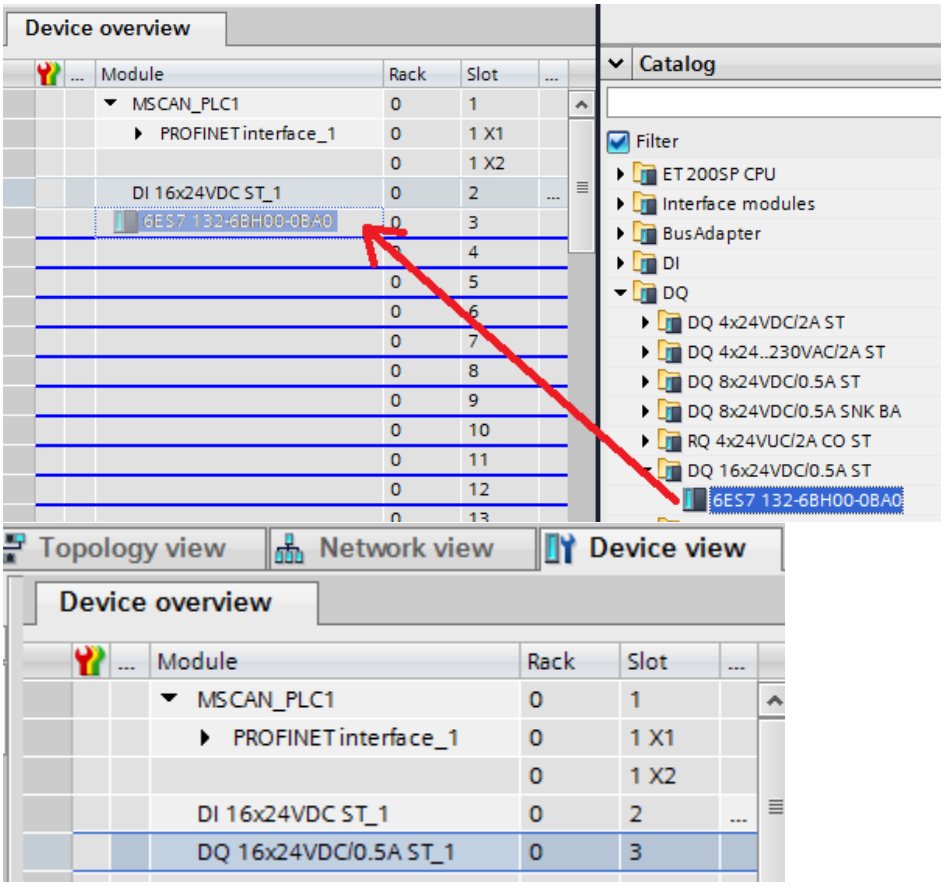
7. To add the Input Card simply drag the icon to **Slot 2**



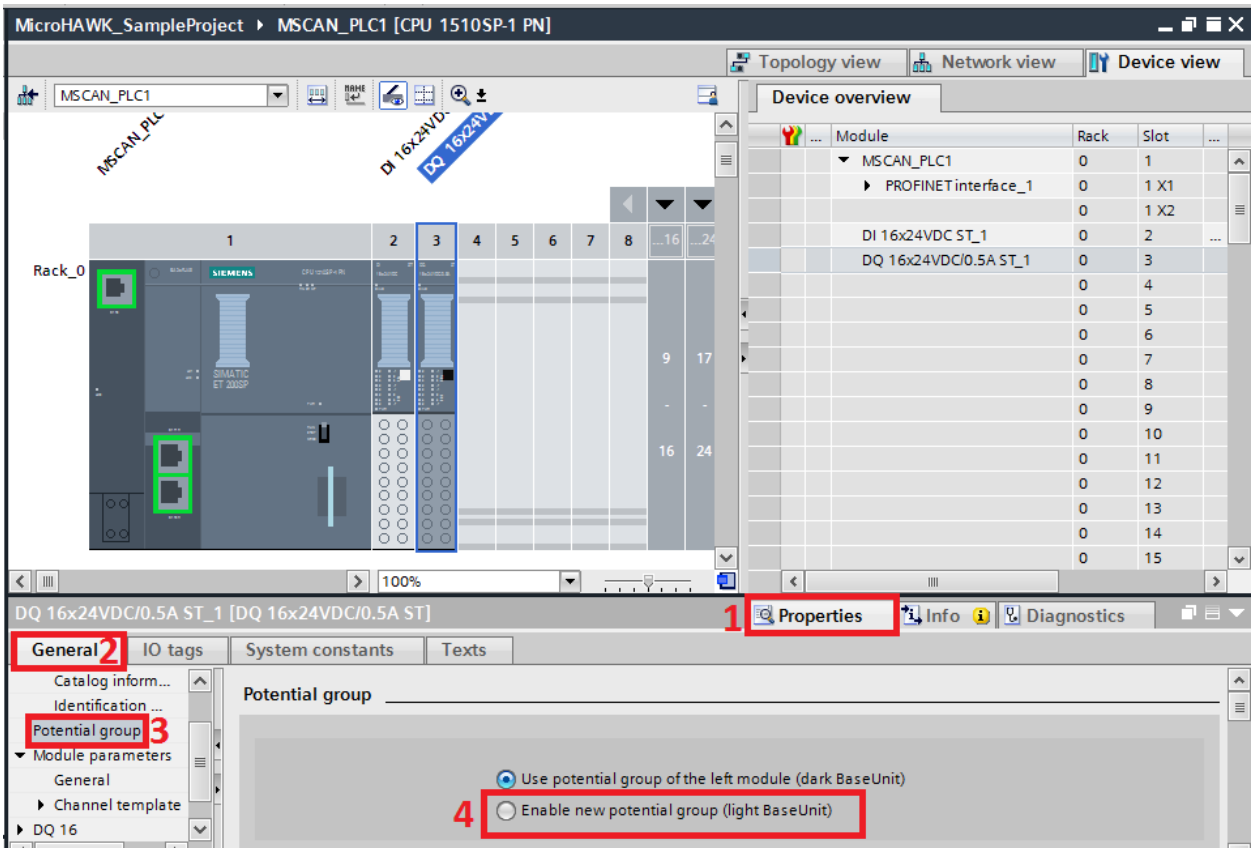
8. To add the Digital Output Card go to the **Hardware Catalog** panel go to **DQ→DQ 16x24VDC ST→6ES7 131-6BH00-0BA0** and verify that Version is **1.0**



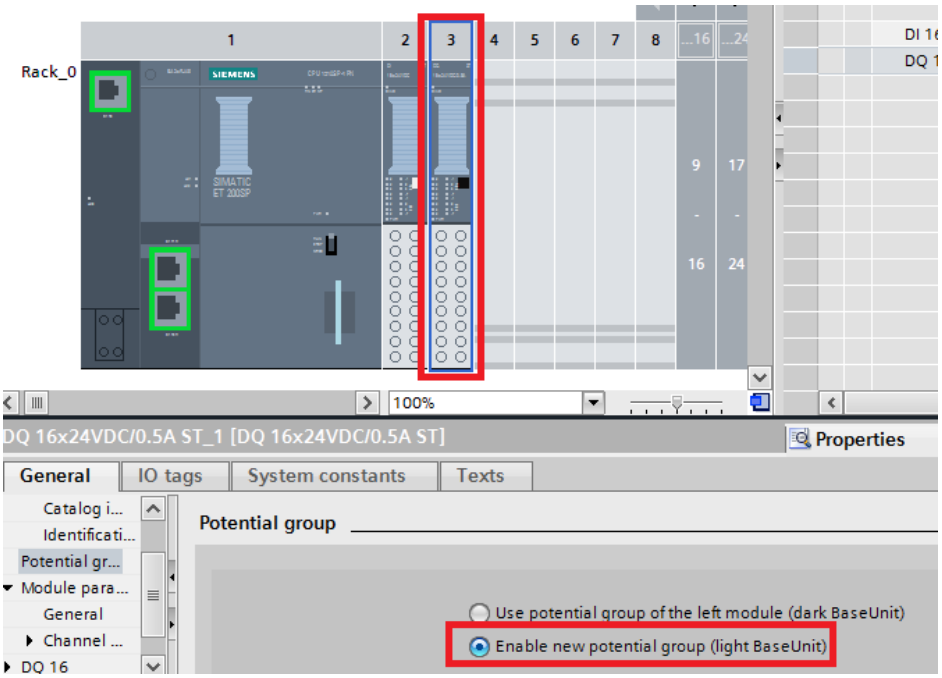
9. To add the output card simply drag and drop the icon into **Slot 3**



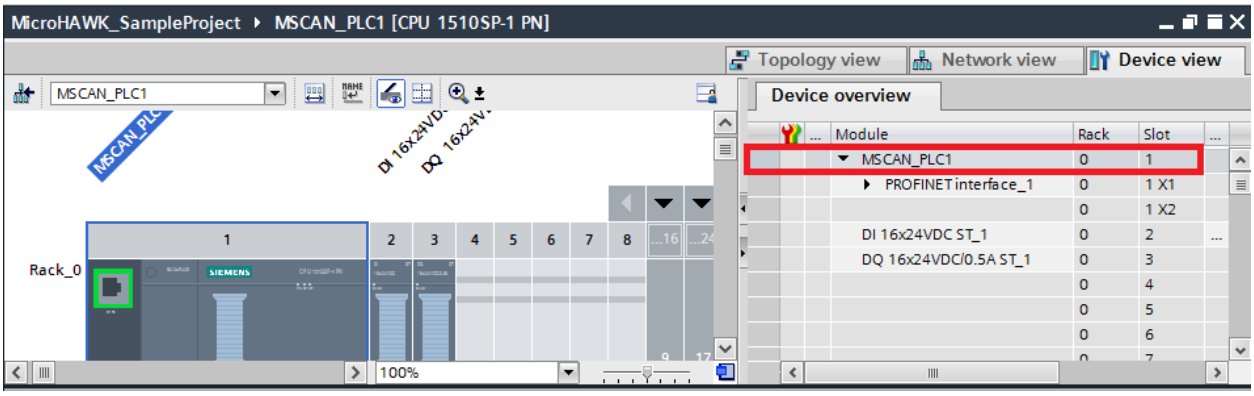
10. Next the Digital Output Card needs to be enabled as a New Potential Group. To do this Click on **Properties (1)** and select the **General Tab (2)** and find **Potential Group (3).** Click the Radial Button **Enable new potential group (light BaseUnit) (4)**



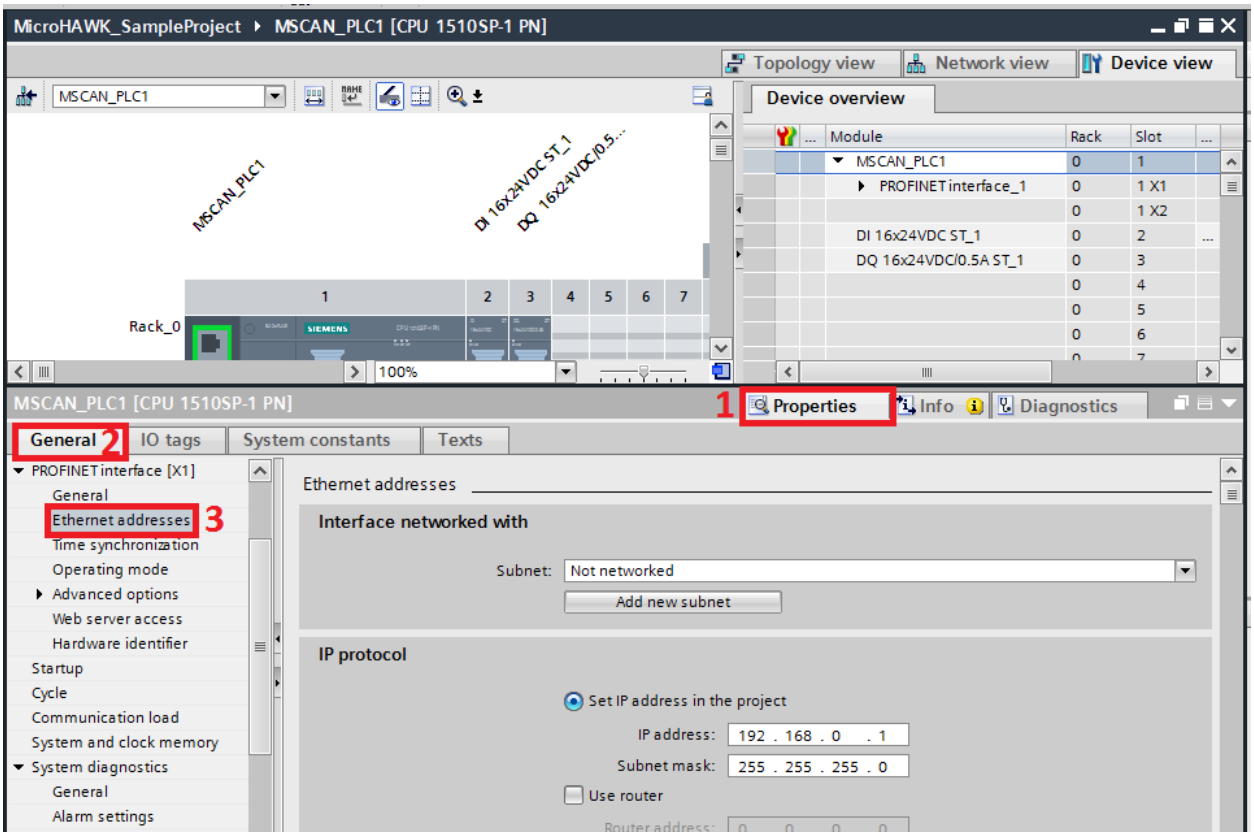
11. The Digital Output will change from a Dark Gray to a light Gray color.



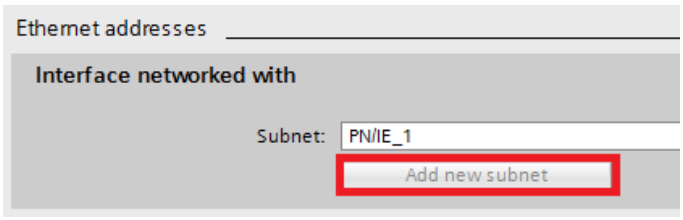
12. Next is to assign the IP Address to the PLC. Select **Rack 0 Slot 1** in the **Device Overview** Panel



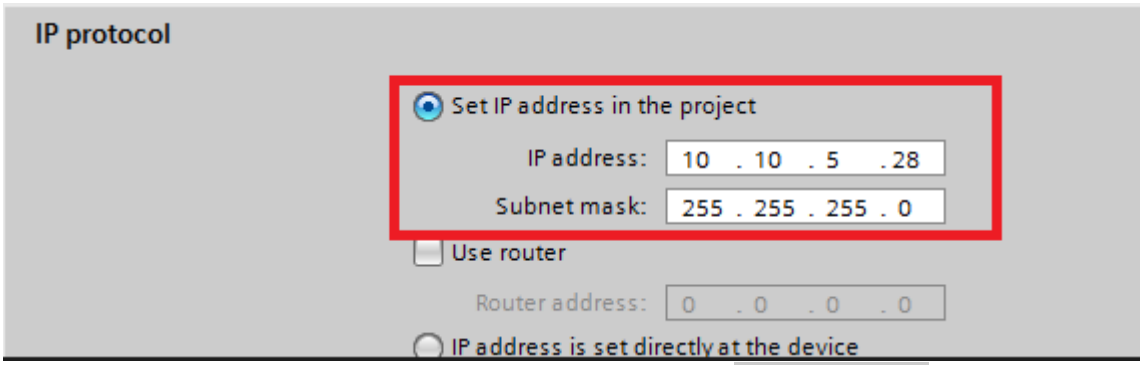
13. In the **Properties Tab (1)** select the **General Tab (2)** and select **Ethernet Addresses (3)**

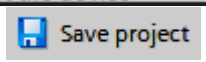


14. In **Interface networked with** select **Add new Subnet**

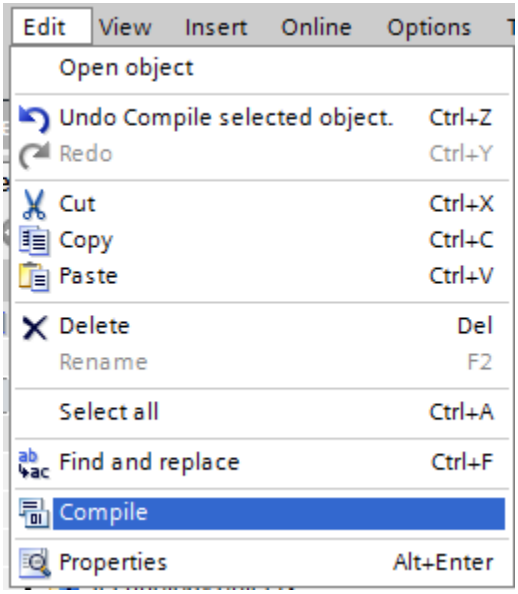


15. In **IP protocol** set the IP to the desired address. In this example the PLC IP Address is set to 10.10.5.28 with a subnet mask of 255.255.255.0



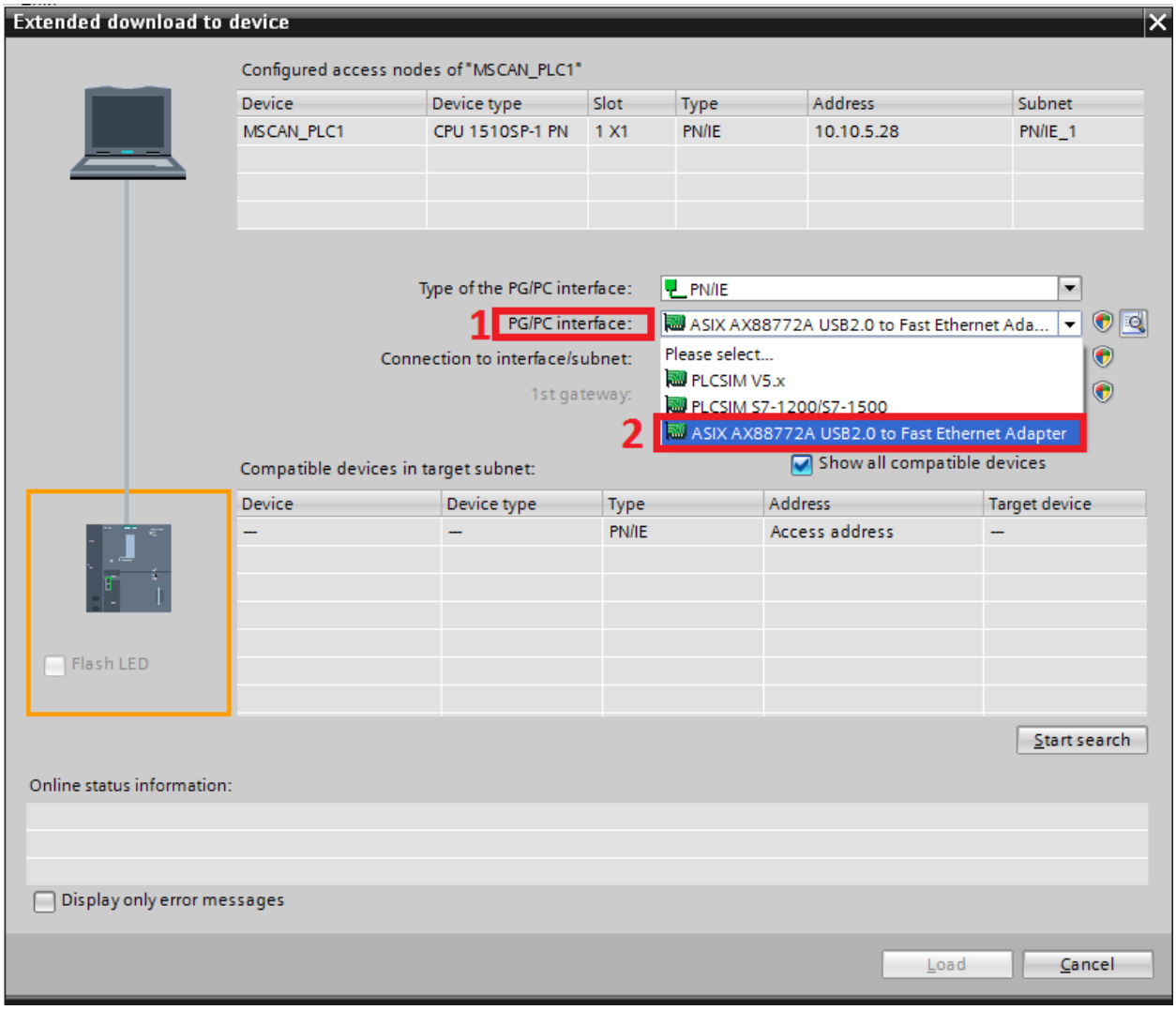
16. Save the project at this time by clicking the **Save project** icon 

17. Compile the Project as this time by selecting the **Compile** Icon  or by selection **Edit→Compile**

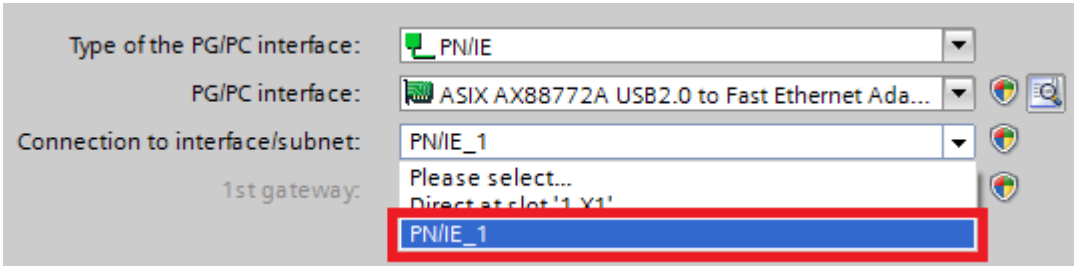


18. Now download the current project to the PLC to assign the PLC a name (Step 3) and IP Address (Step 15). To do this click the **Download** Icon  to download the project to the controller

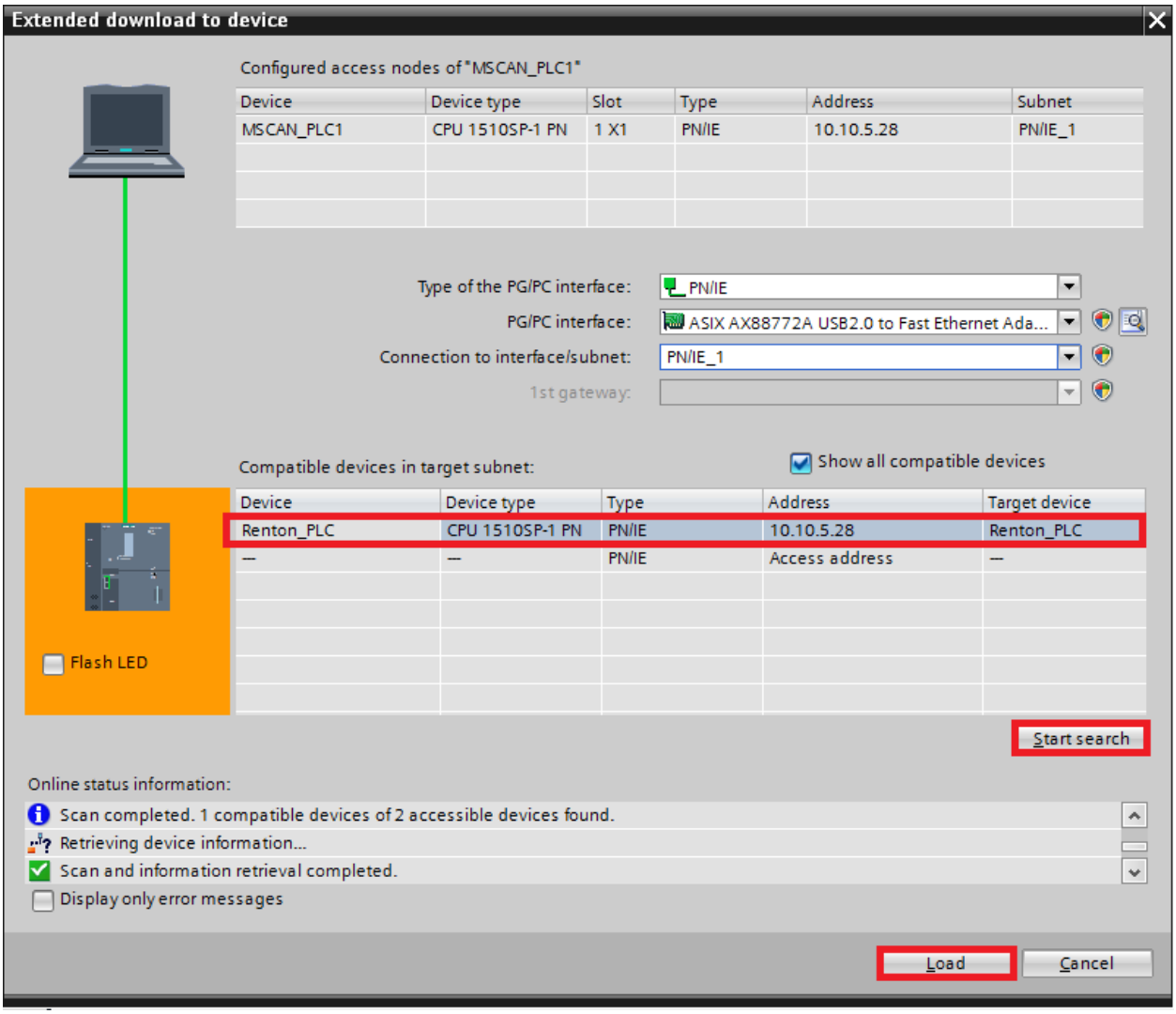
19. Select the **PG/PC Interface (1)** dropdown and select the NIC Card that the PLC is plugged into on the programmers computer (In this example the NIC card is the **ASIX AX88772A USB2.0 to Fast Ethernet Adapter (2)**).



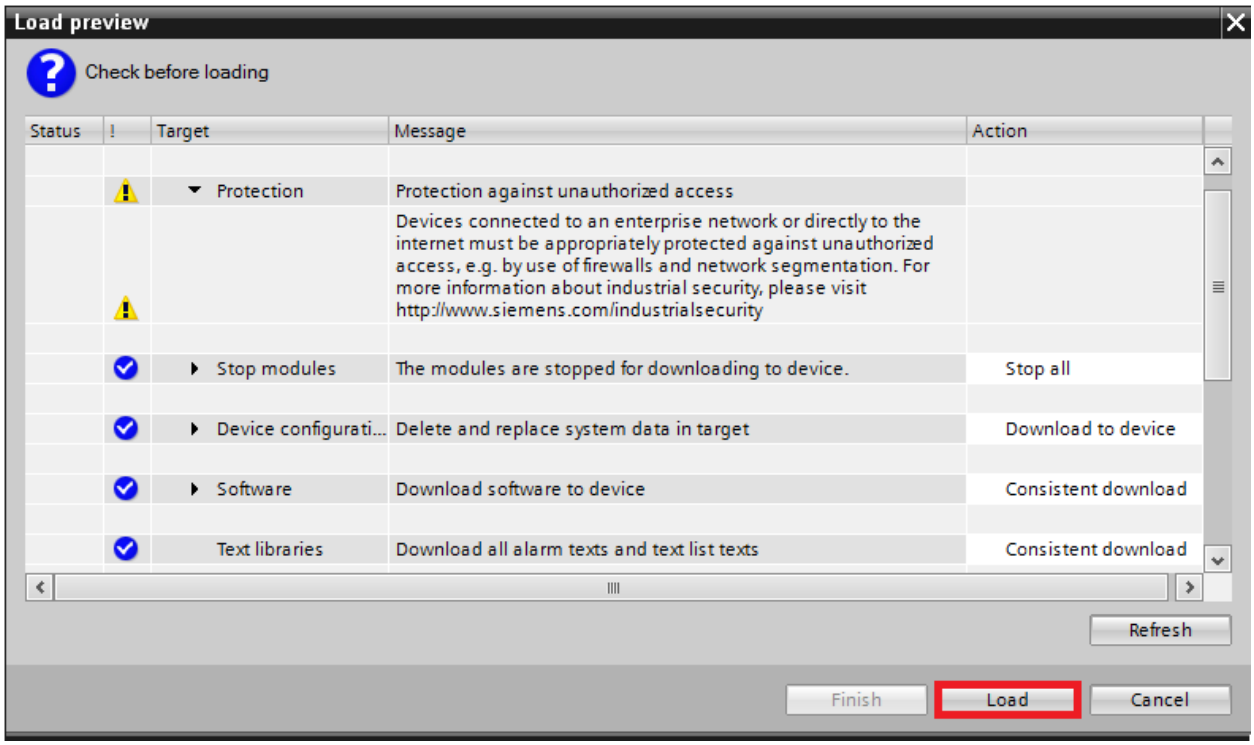
20. In **Connections to interface/subnet**: Select **PN/IE_1** or the network interface name given in **Step 14**



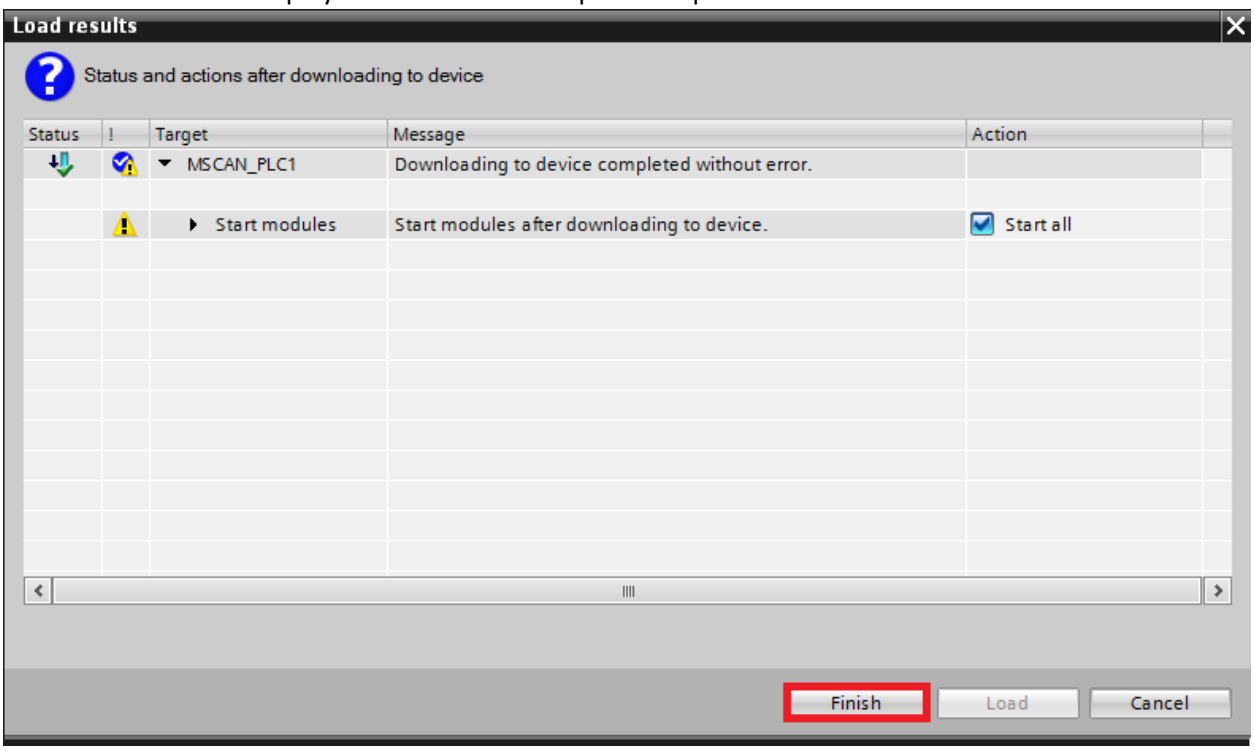
21. Click **Start Search** to find the PLC on the network. The PLC should be displayed in the **Compatible Devices in Target** Subnet table. Click the **Load** button



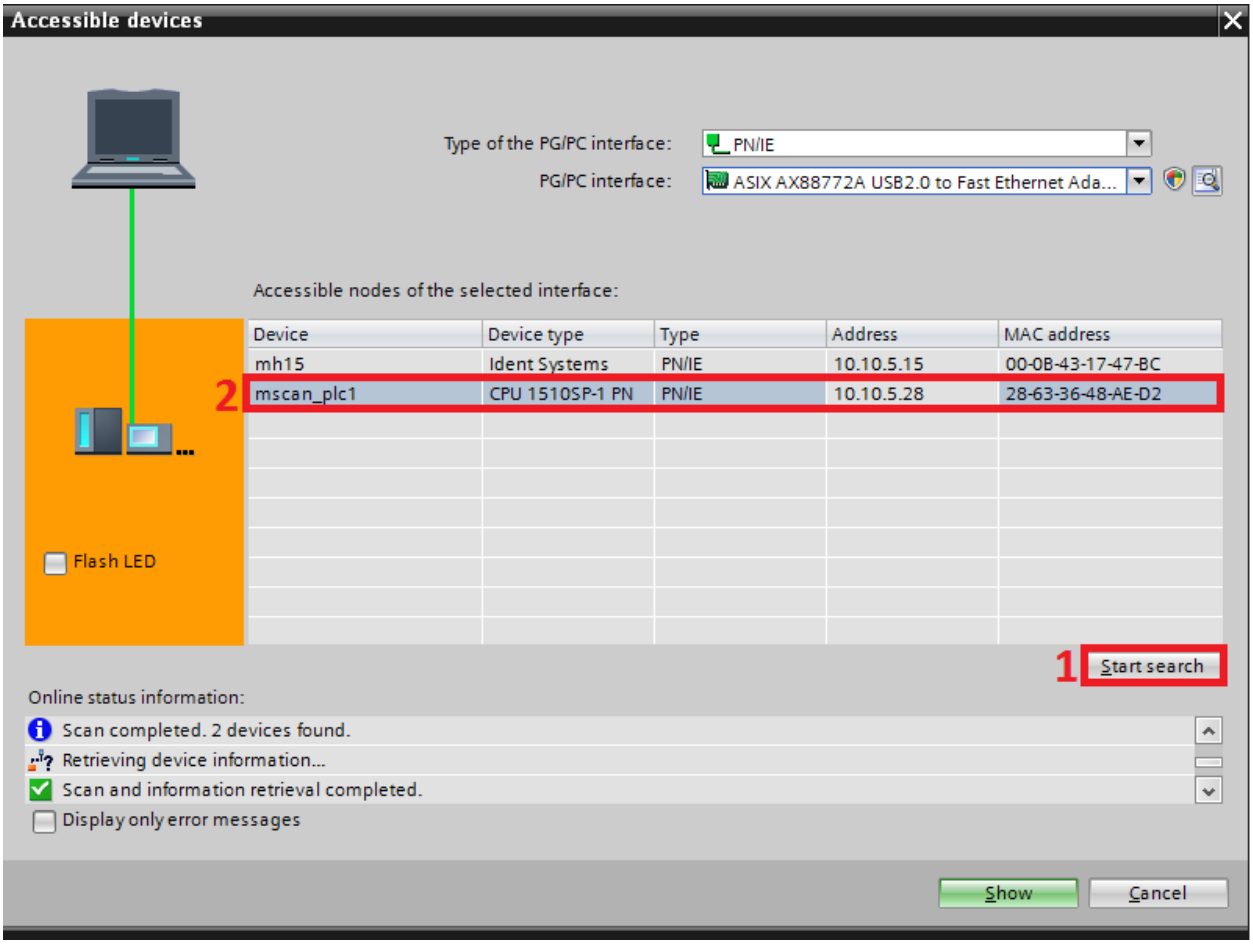
22. The Load Preview will display. Click **Load** to load the project into the PLC



23. The Load results will display. Click **Finish** to complete the process

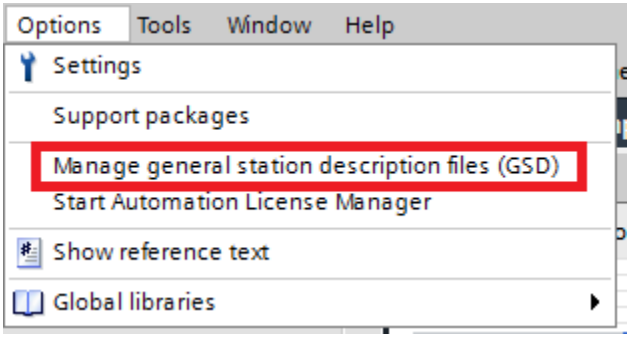


24. When loading has completed, the PLC should now be named with the name assigned in Step 3 and the IP Address assigned in Step 14. To verify this select the **Accessible Devices** Icon and in the Dialog box click the Start Search button find the PLC with the new name and IP Address.



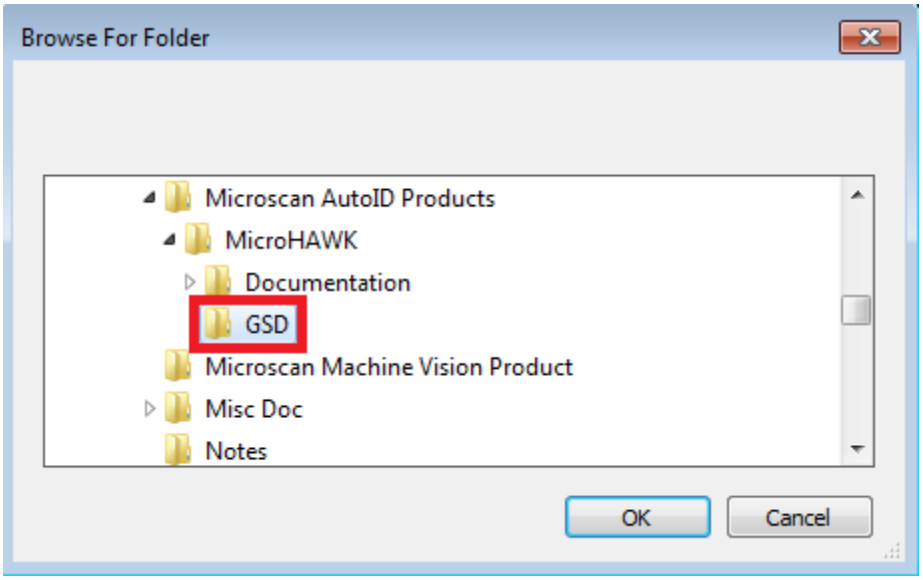
4.4 Installing the MicroHAWK GSDML File

25. To Install the MicroHAWK GSDML file go to **Options→Manage general station description files (GSD)**



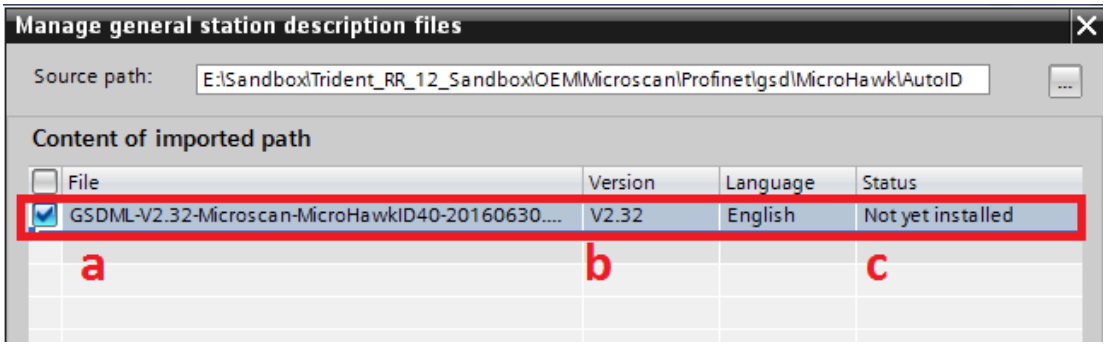
26. Select the **Browse** icon

27. Navigate to the location of the GSDML File.



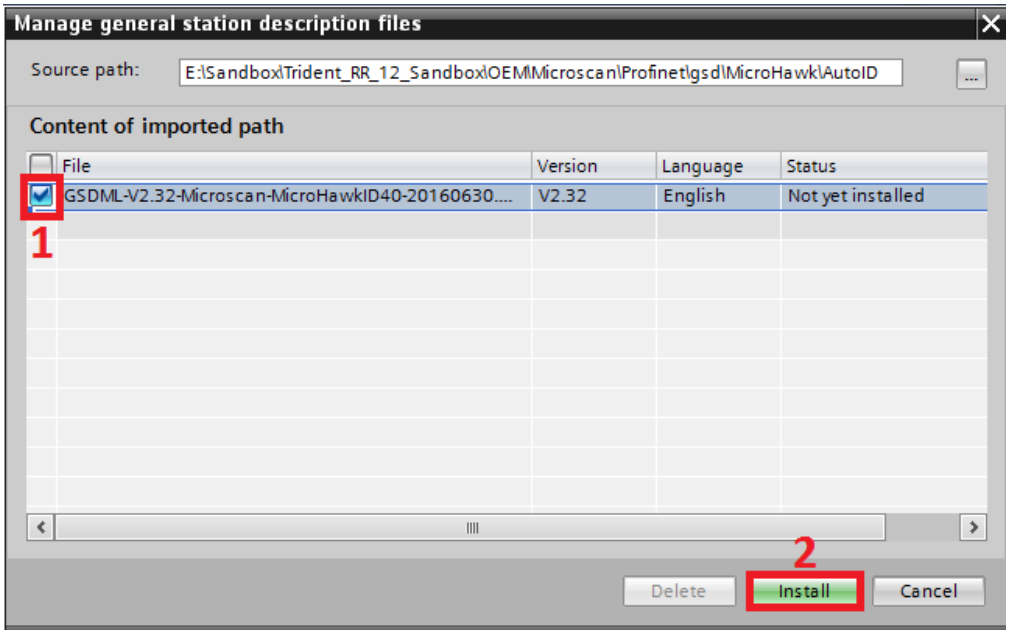
a. You can find a copy of this on the Microscan Download website and clicking **GSD**

28. The Content of imported path will display the MicroHAWK GSDML File and verify the following

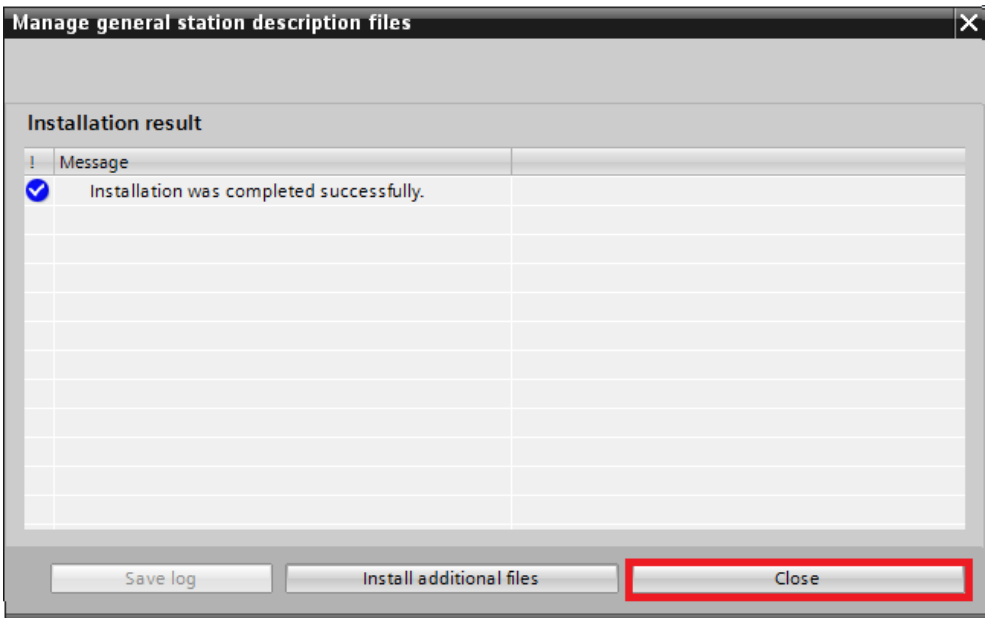


a. File Name: GSDML-V2.32-Microscan-MicroHawkID40-20160630
b. Version is: V2.32
c. Status: Not Yet installed

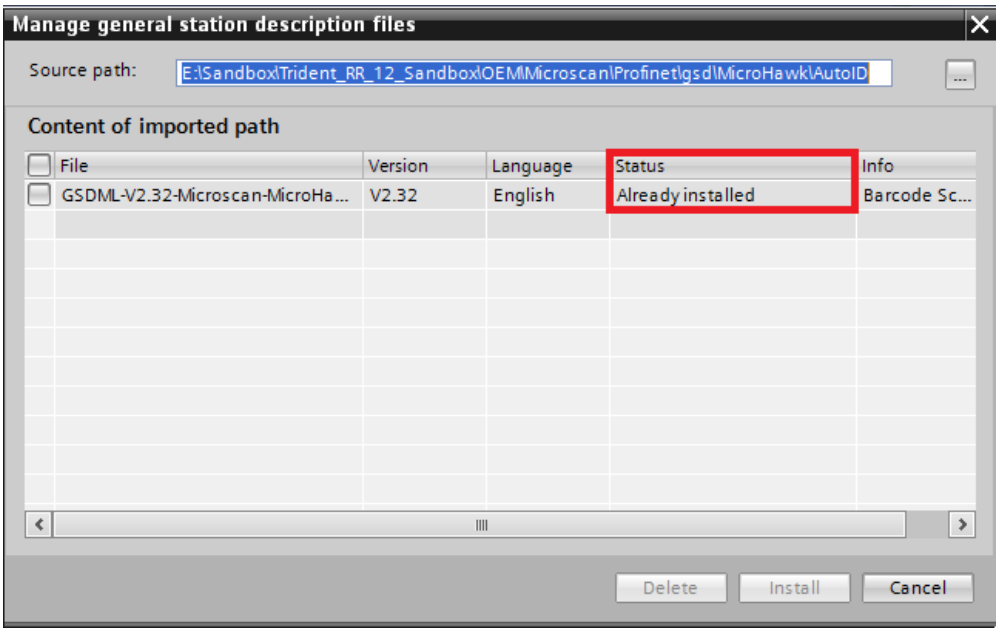
29. If the correct file is displayed with the correct version and the status is Not yet installed than **click on the box to the left (1)** and click **Install (2)**.



30. When installation is complete a dialog box will display the **Installation result**. If the installation failed than resolve the conflict before proceeding. Click **close** after a successful install.

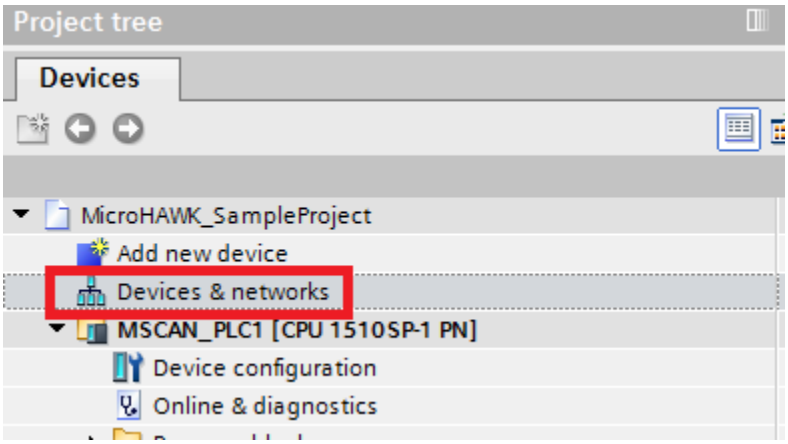


31. TIA Portal will complete the installation process. To verify that the GSDML is installed go to **Options→Manage general station description files (GSD)** as in Step 25. The status will now display **Already Installed.**

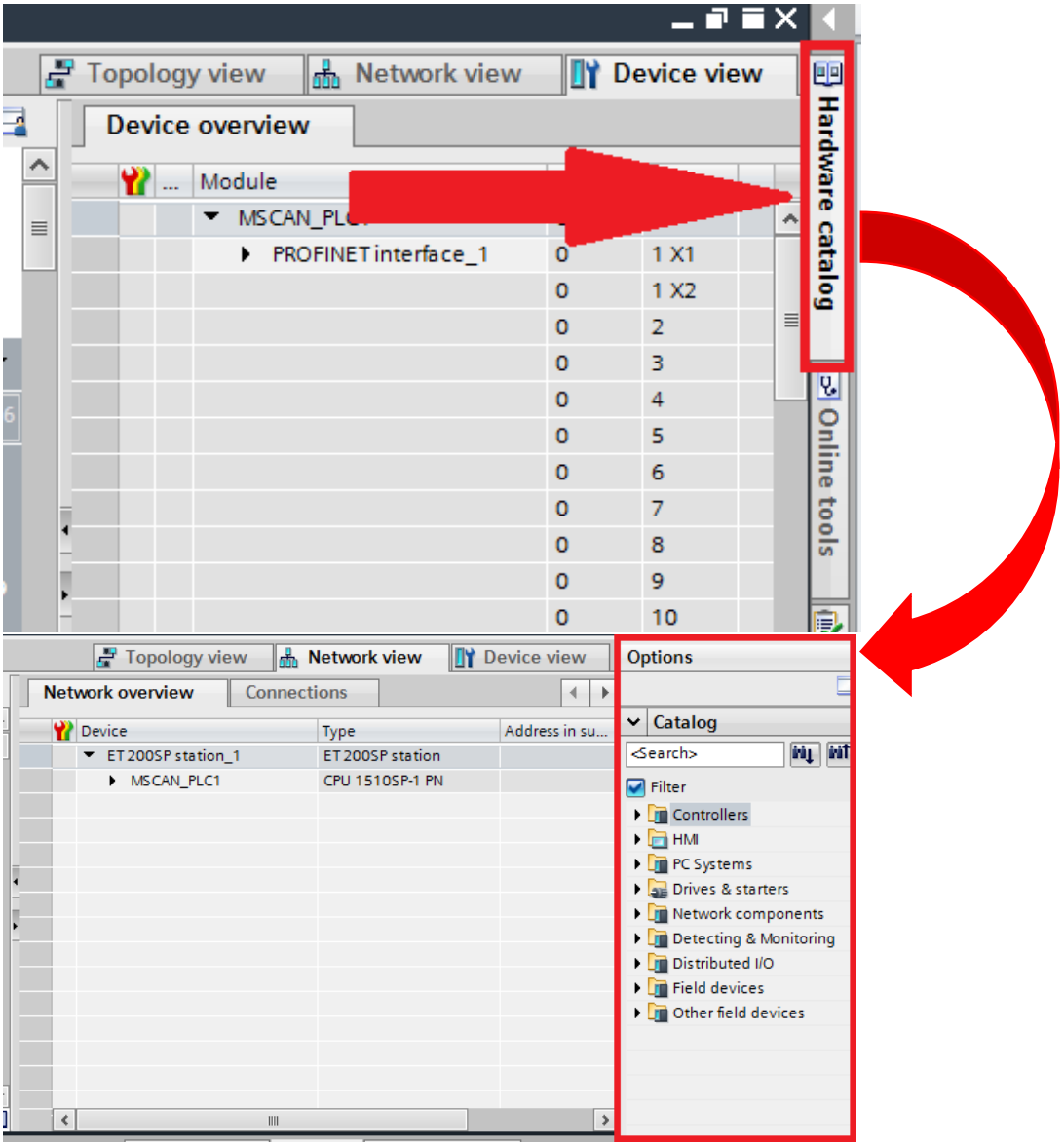


4.5 Adding the MicroHAWK Unit to the TIA Portal Project

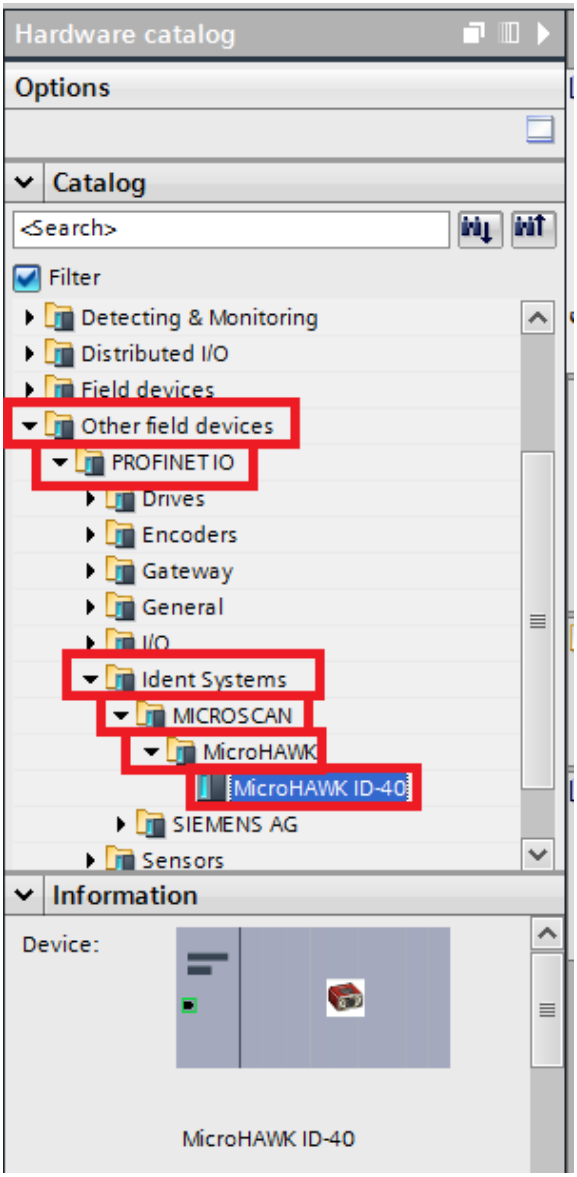
32. After installing the GSDML File the MicroHAWK can now be added to the TIA portal project. To add the MicroHAWK, double click the **Devices & networks** icon in the **Devices** panel.

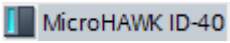


33. Click on the **Hardware catalog** tab to display the hardware that can be added to the controller.

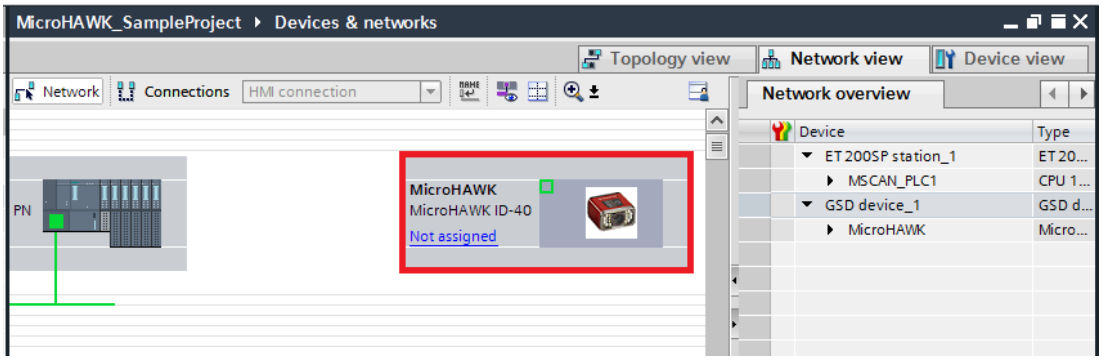


34. In **Catalog** go to **Other field devices→PROFINET IO→Ident Systems→MICROSCAN→MicroHAWK→MicroHAWK ID-40**

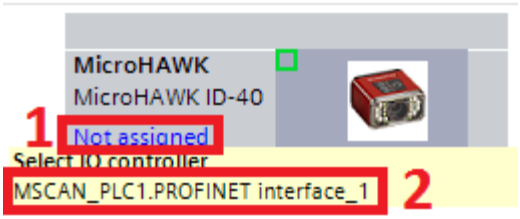


35. Click on the **MicroHAWK ID-40**  and drag the icon to the **Network view** panel

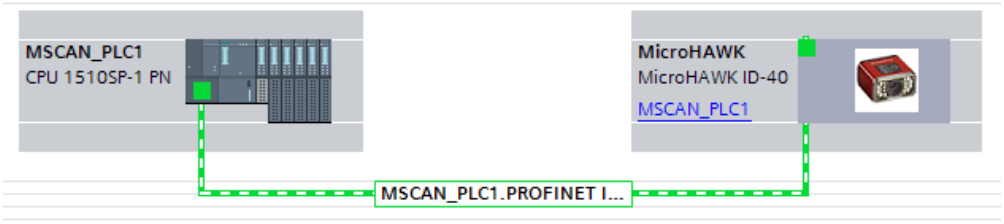
36. The MicroHAWK is now added to the network



37. Assign the MicroHAWK to the same ProfiNET network by clicking the **Not assigned (1)** and selecting the **PLC Profinet interface (2)**. This example the interface name is called **MSCAN_PLC.PROFINET interface_1.**



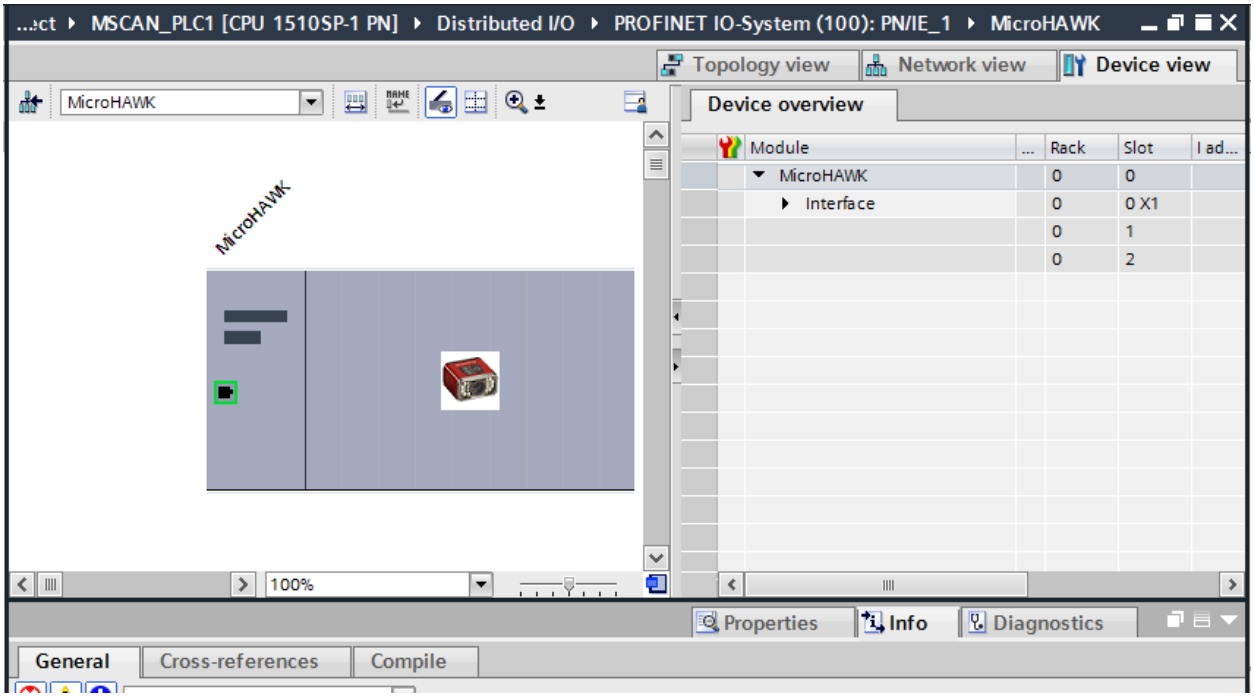
38. The Controller and the MicroHAWK are now interfaced through the ProfiNET interface.



4.6 Assigning Name and IP Address

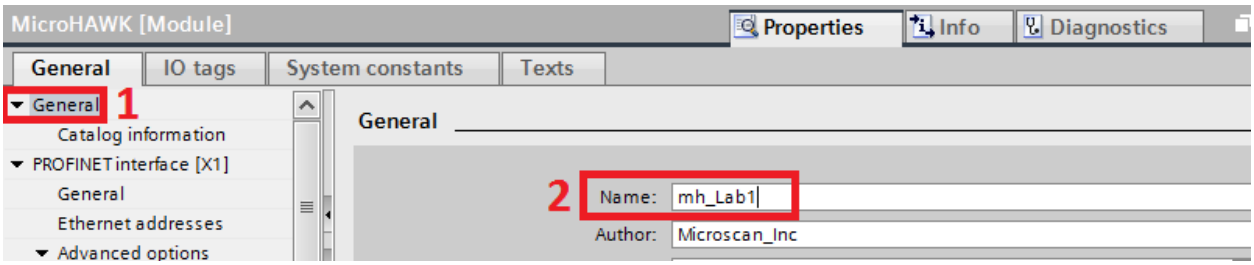
39. Double click the MicroHAWK ID-40 icon 

to display the Device View.

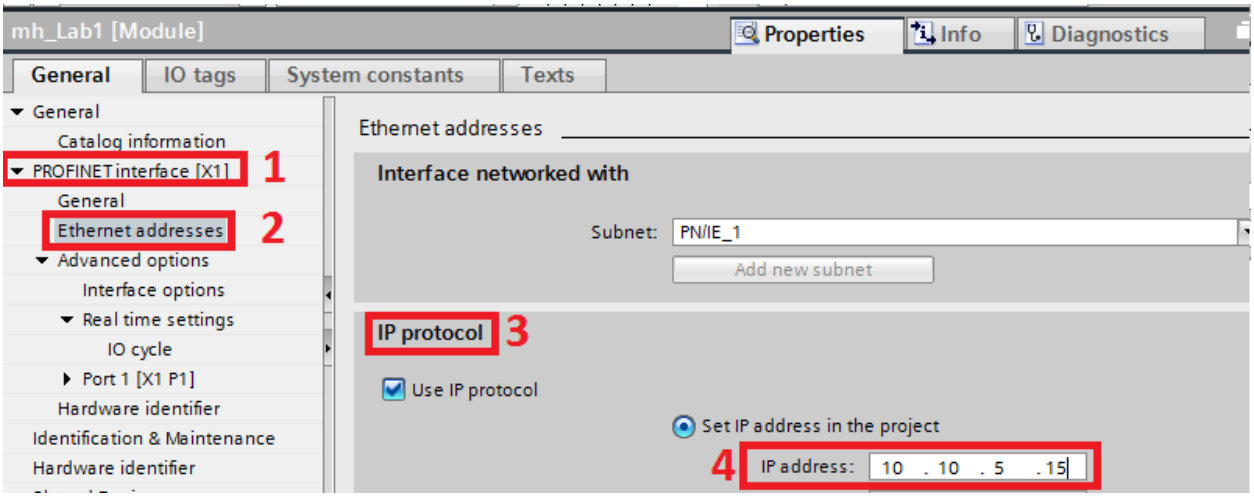


40. Select the **MircoHAWK (1)** icon then select the **Properties (2)** tab.

41. Select **General** and change the name of the MicroHAWK to a unique name for the ProfiNET network. **There cannot be another device named the same on the network!**

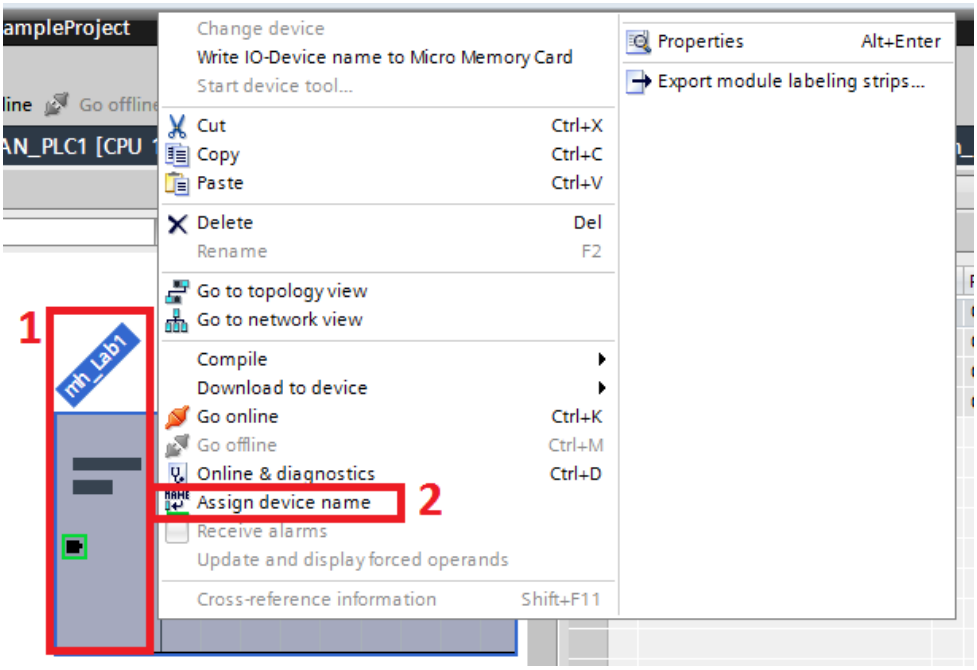


42. Select **PROFINET interface [X1] (1) →Ethernet address (2)** and scroll down to **IP protocol (3).** Set the **IP Address (4)** to the desired IP address for the network. In this example the IP address is set to 10.10.5.15.

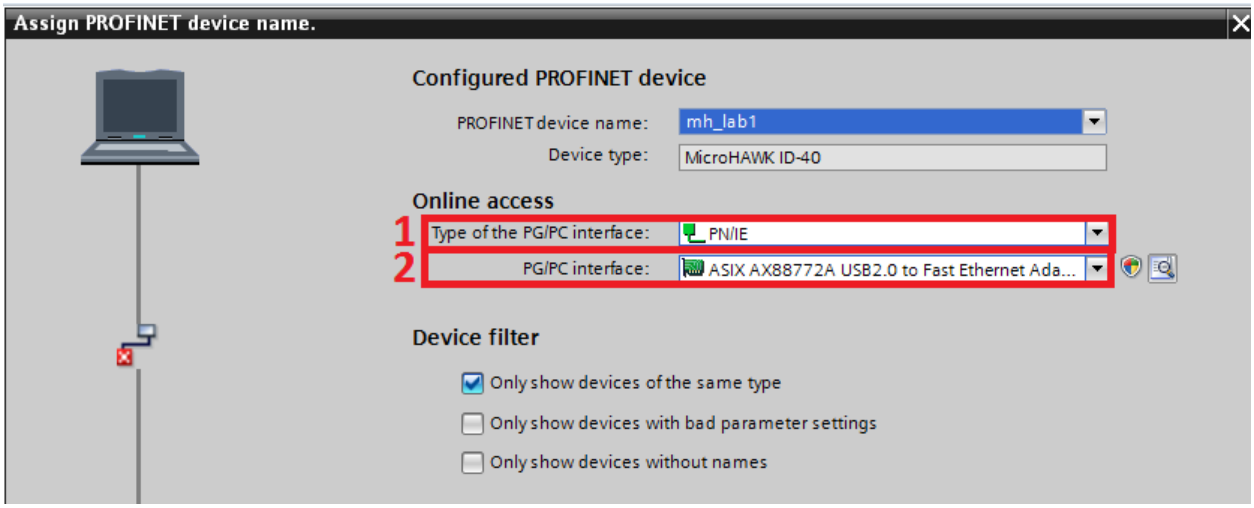


43. Save the project by clicking the **Save project** icon 

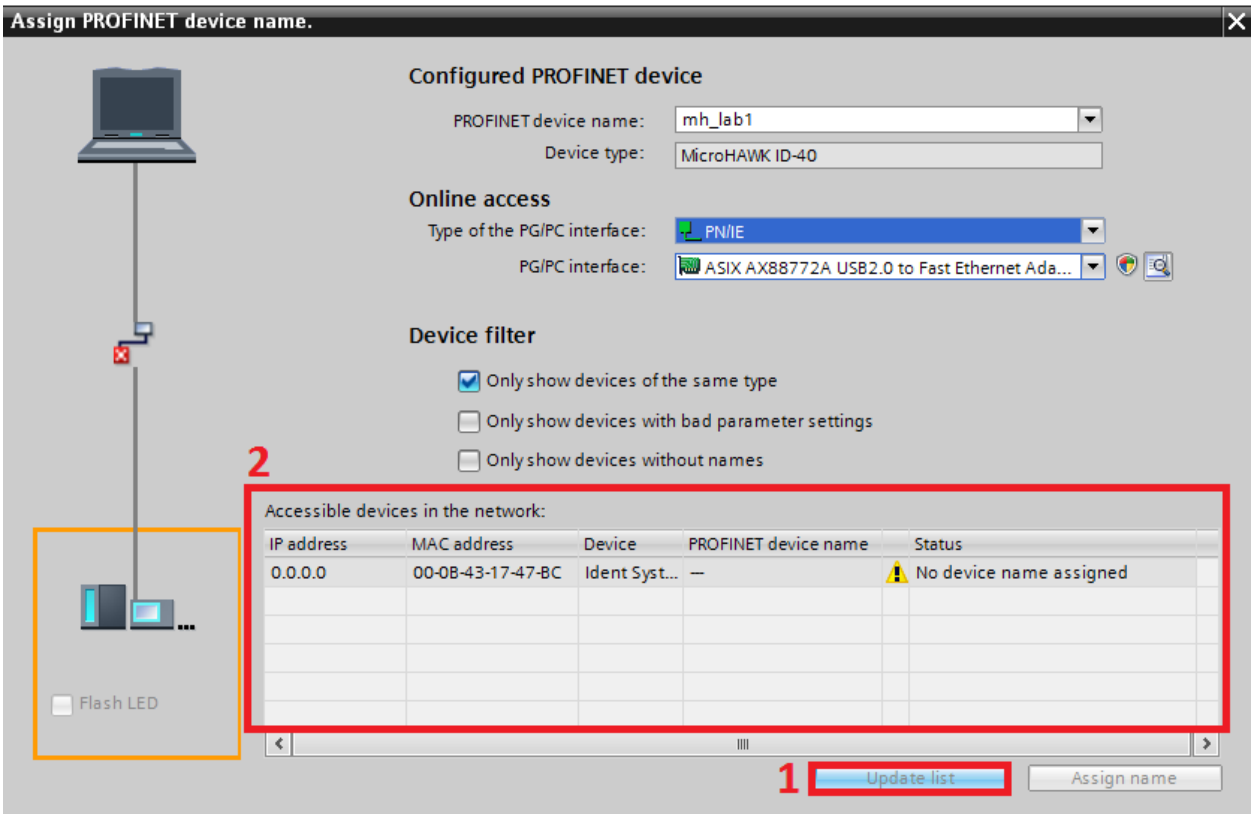
44. To assign the name in Step 41 right click the **MicroHAWK (1)** icon in the Device View and select **Assign device name (2).**



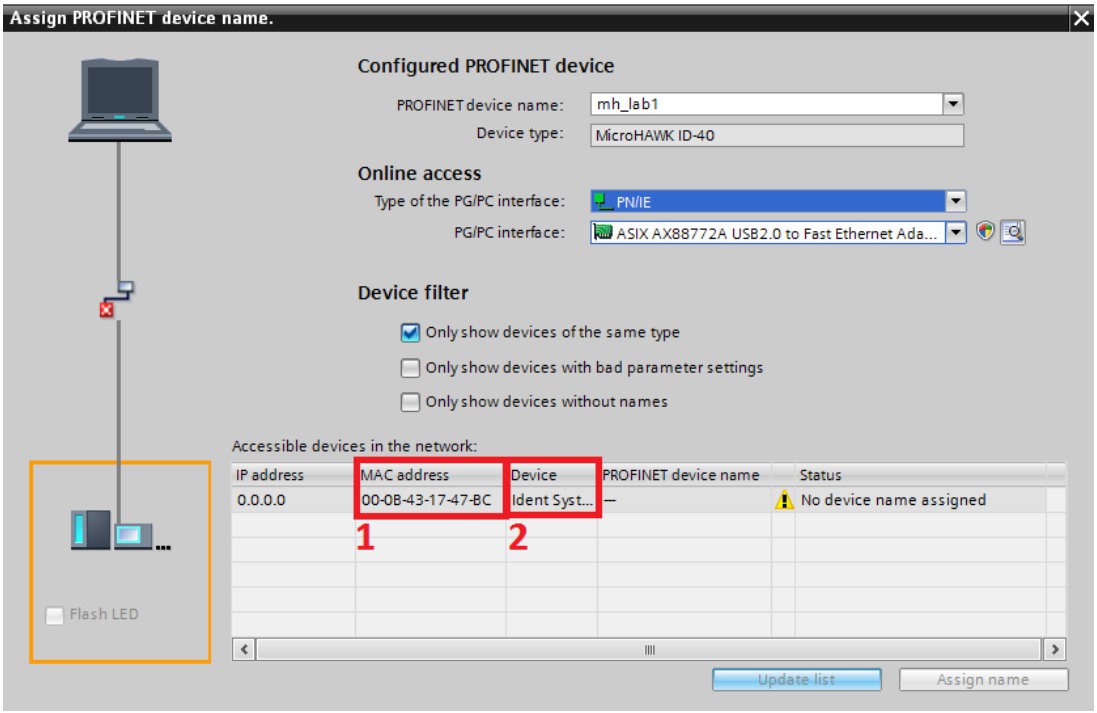
45. Verify that the **Type of PG/PC interface (1)** is PN/IE and the **PG/PC interface (2)** is using the correct NIC card.



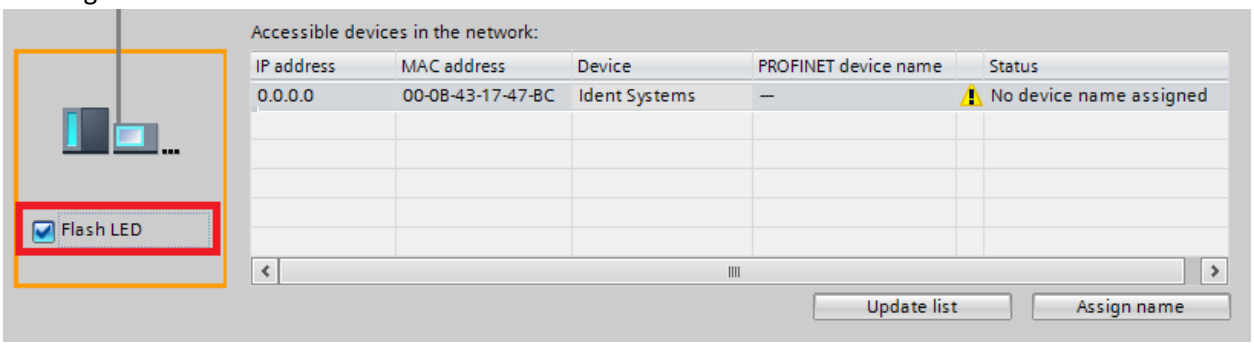
46. Click **Update list (1)** to refresh the **Accessible devices in the network table (2)**



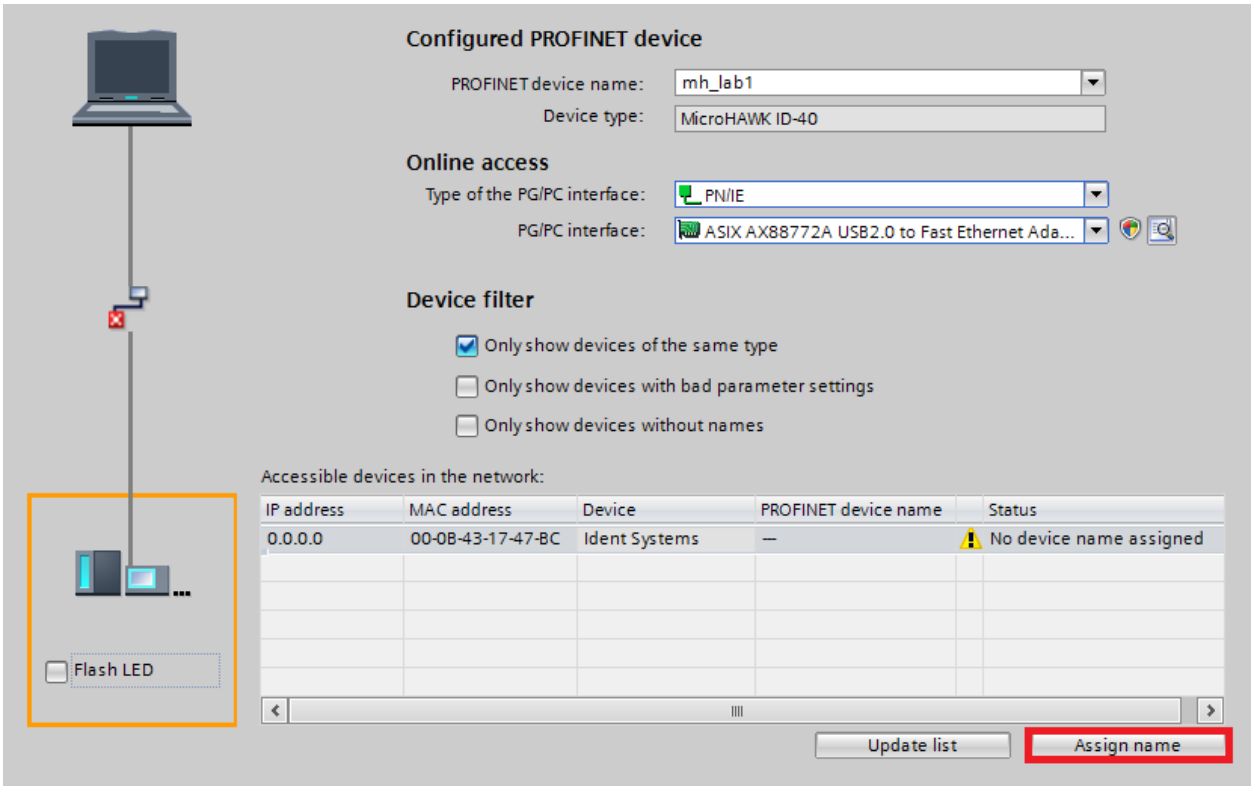
47. Verify the **MAC address(1)** matches the MAC address on the unit and that the **Device(2)** is an **Ident Systems**



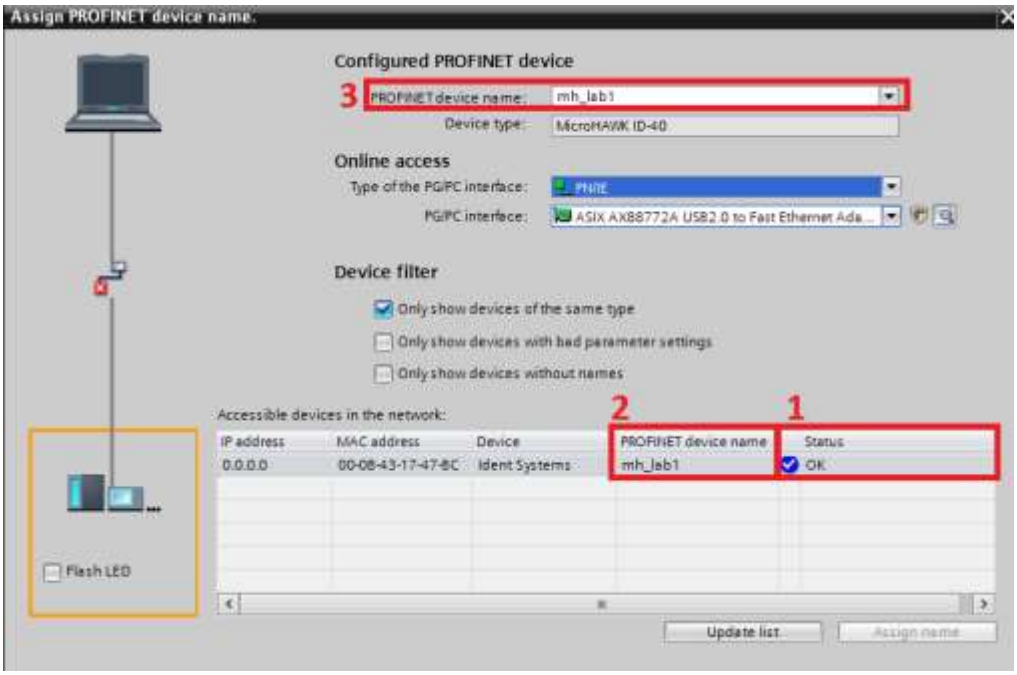
48. The unit can also be easily identified by selecting the Flash LED. The Front Green LED's will light blink and well as the top bank of LED's. This helps easily identify that the correct unit is about to be assigned the name. To do this select the unit in the table and check the box Flash LED.



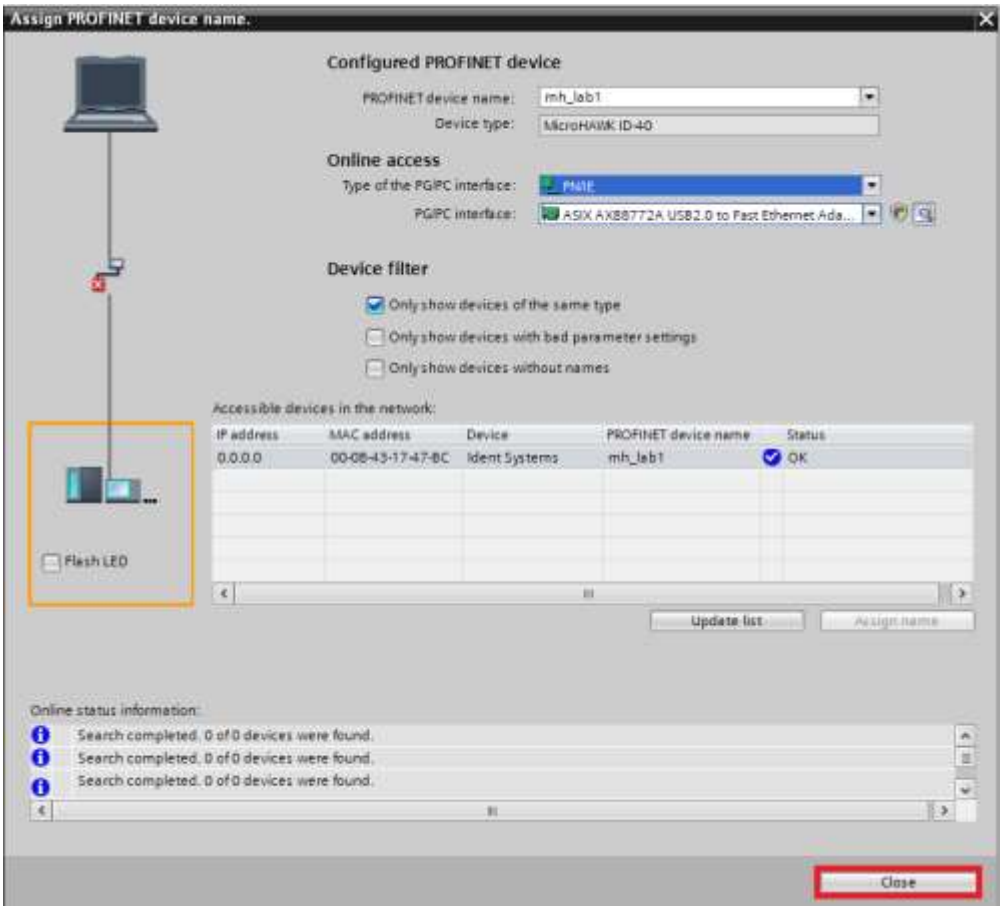
49. After the unit has been verified click Assign Name to assign the name to the unit.



50. The status will change from **No device name assigned to OK (1)** and the **PROFINET device name (2)** is updated to the **PROFINET Device Name (3).**

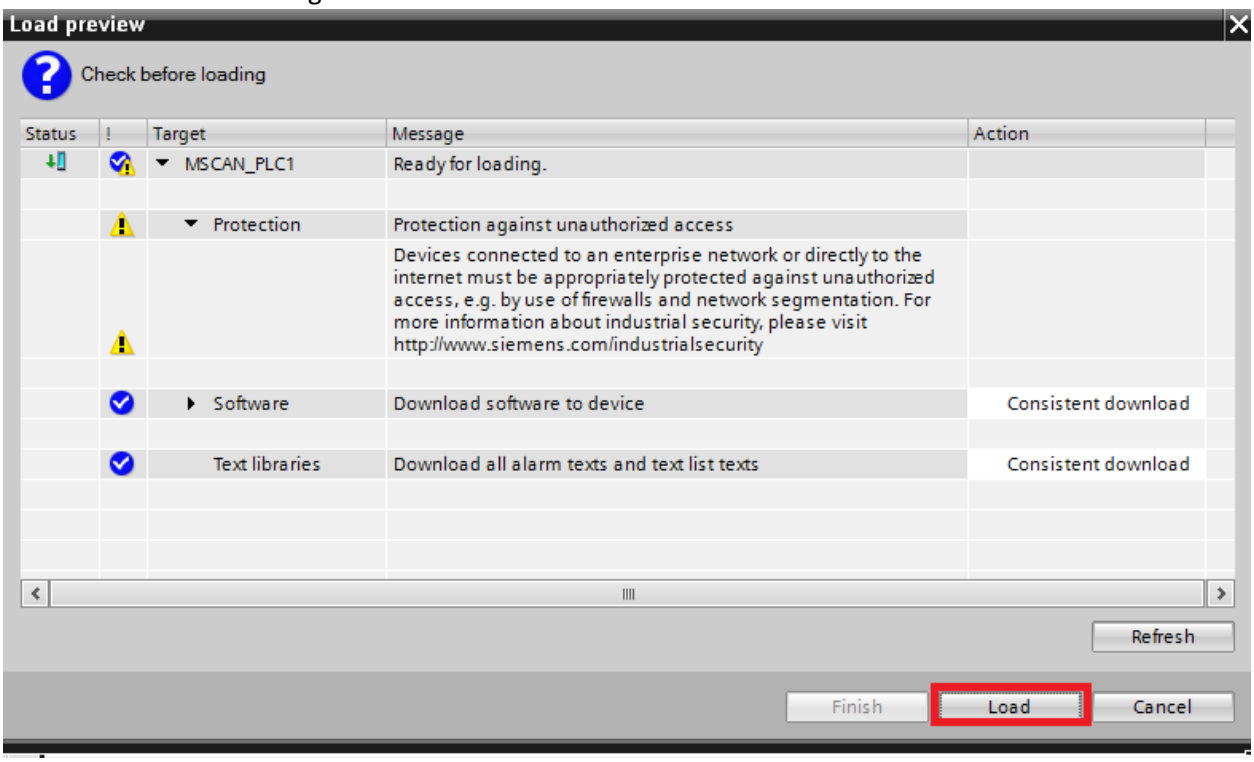


51. Click close to close the dialog box

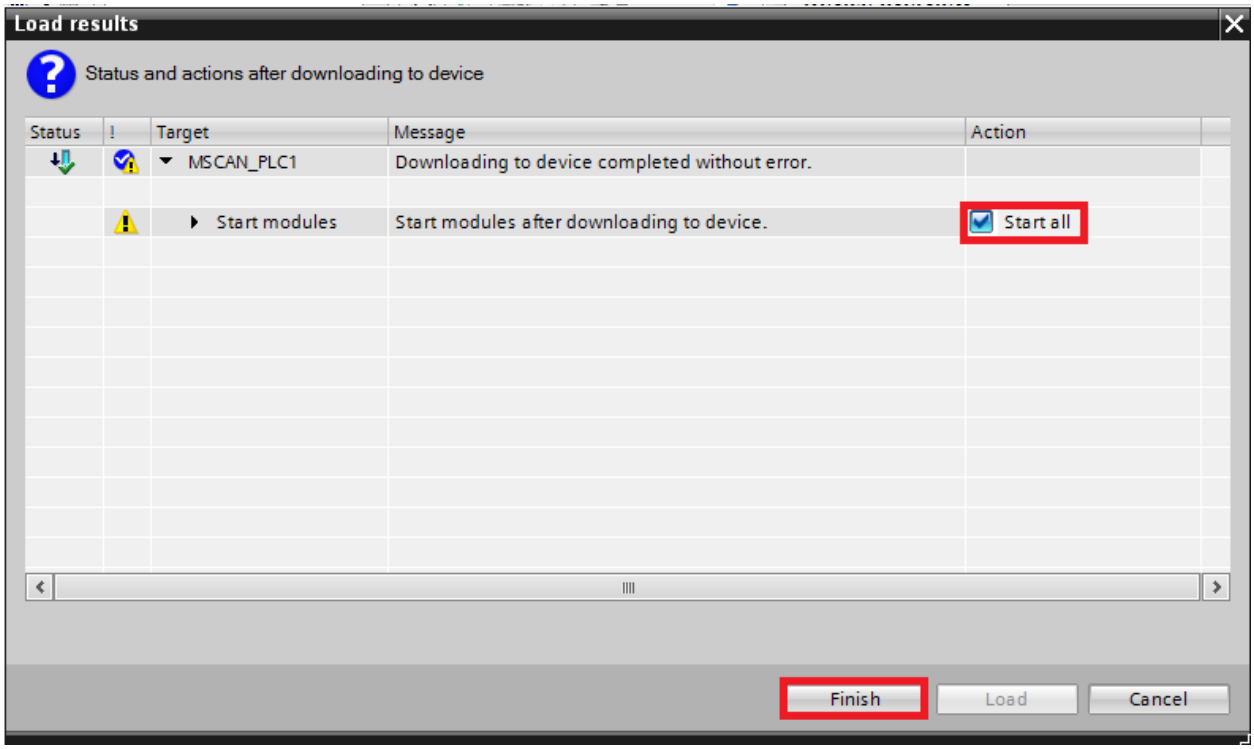


52. To download the IP Address **compile** the project  and click **download** 

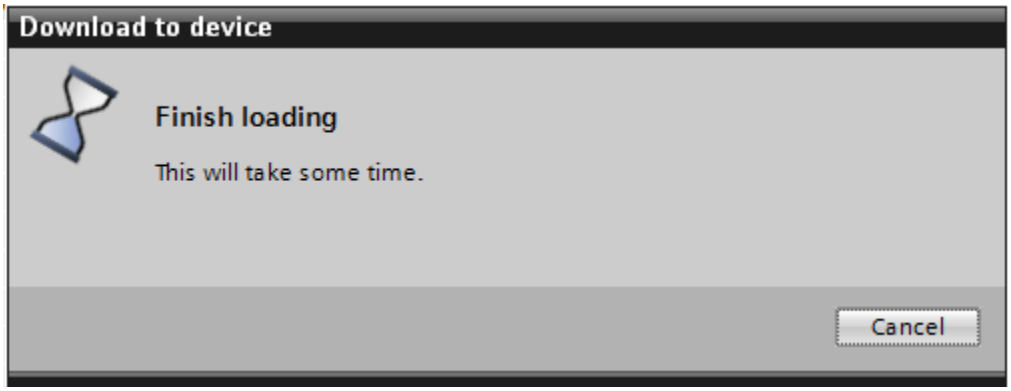
53. In the **Load Preview** dialog click **Load**



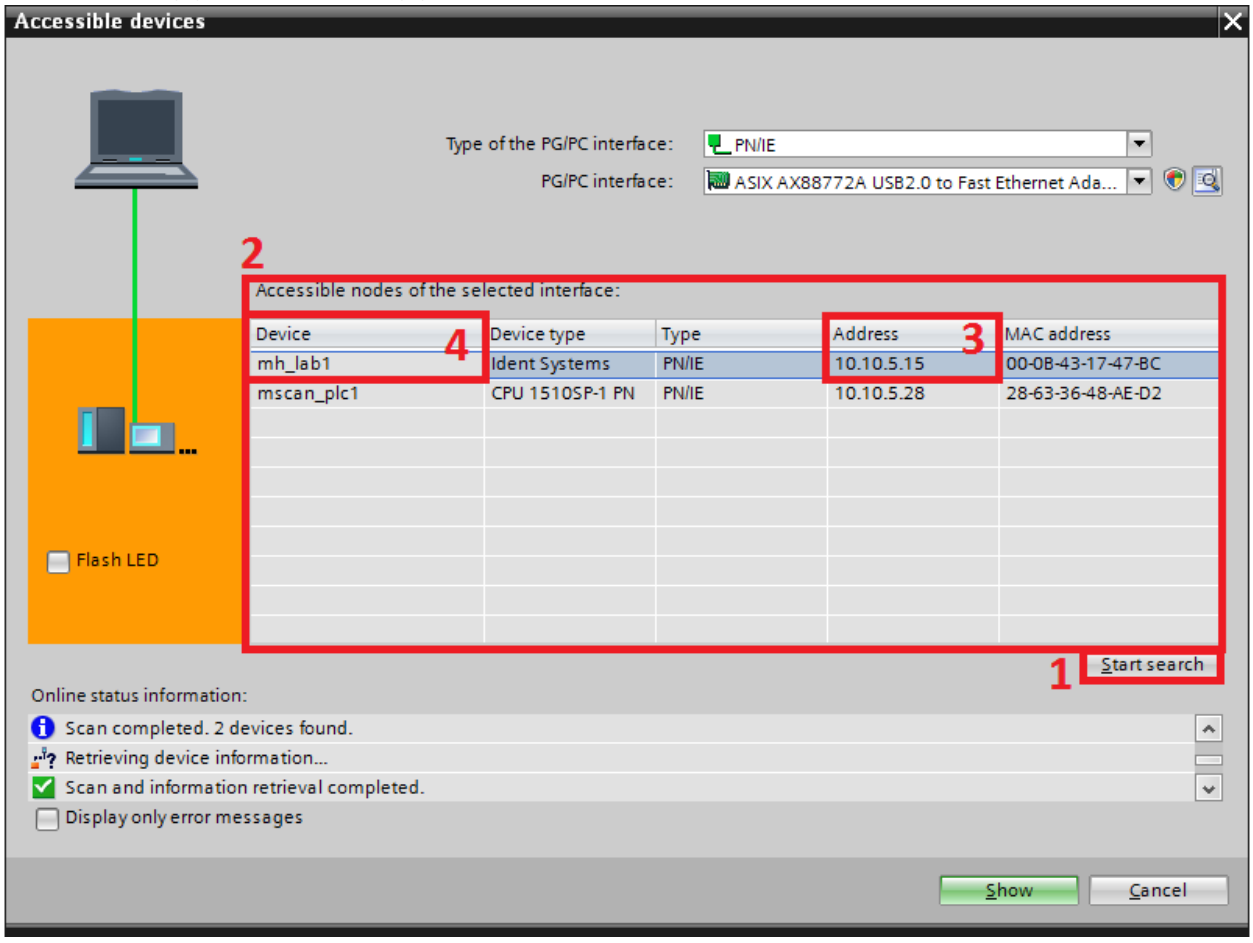
54. In the **Load Results** dialog check the box **Start All** then click Finish



55. This part may take some time



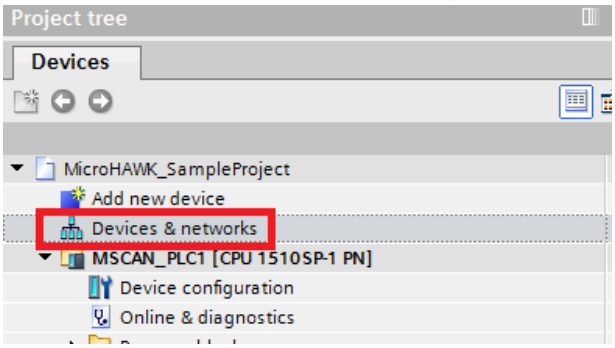
56. Verify that the unit has the IP Address by clicking the **Accessible Devices** Icon  and click the **Start Search (1)** button to display all nodes on the **interface (2).** Notice the MicroHAWK has the correct **name (3**) and **IP Address (4).**

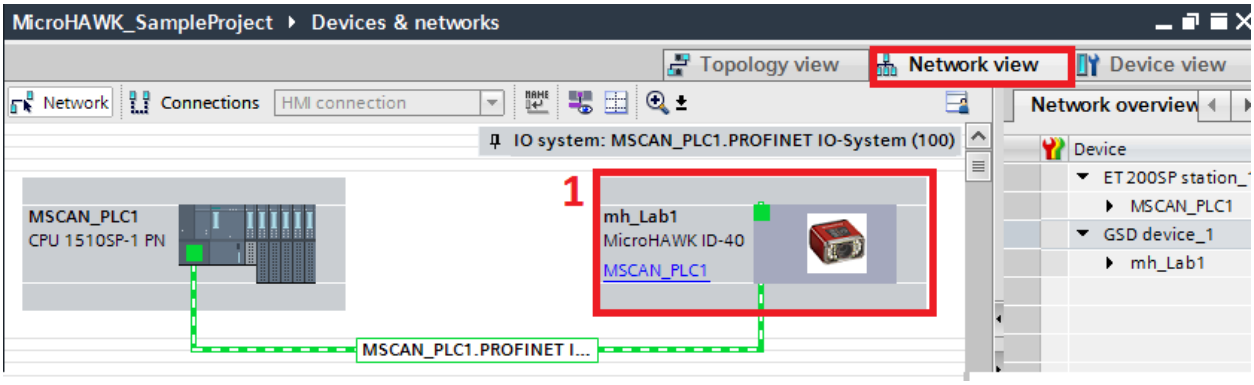


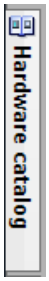
57. Click Cancel to close the Accessible devices window.

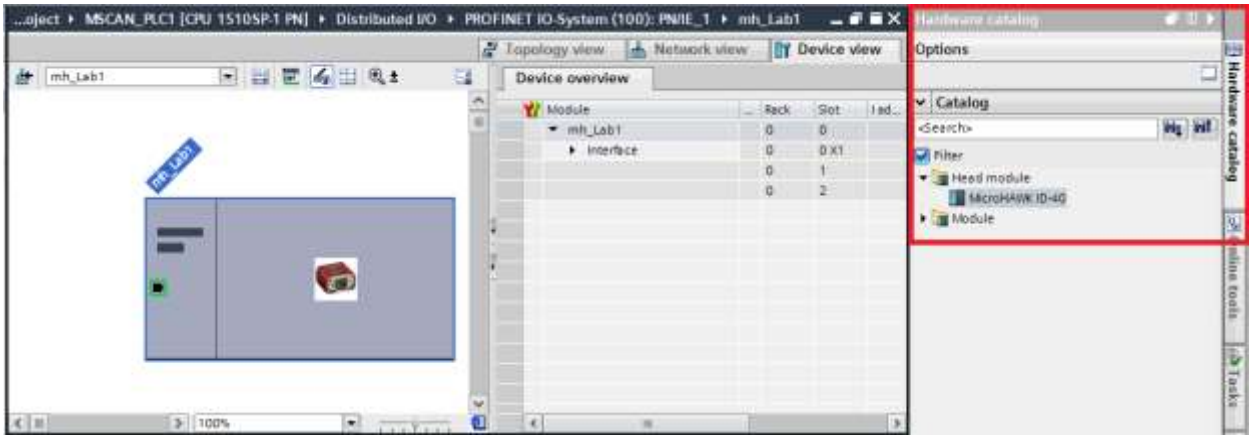
4.7 Adding Input/Output Modules

58. Navigate to the **MicroHAWK Device View**. To do this double click **Devices & networks** and double click the **MicroHAWK ID-40 (1)** icon in the **Network view**

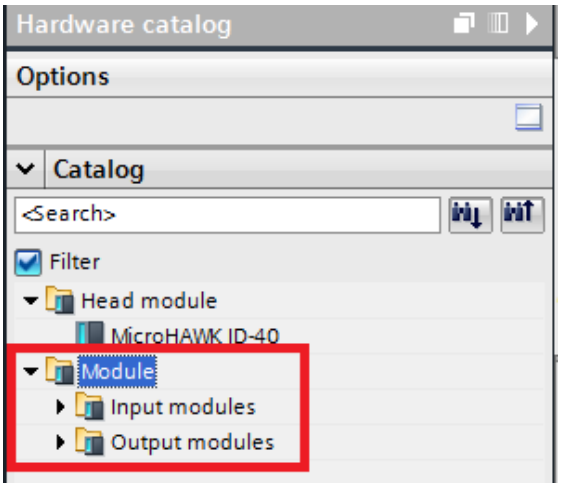




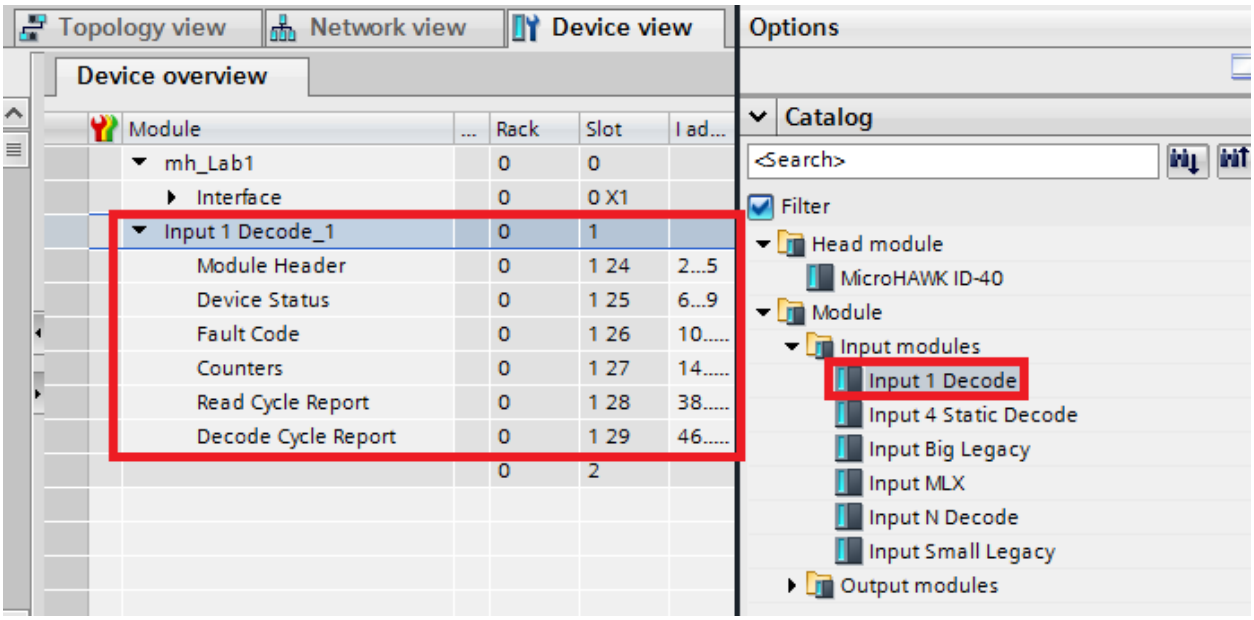
59. In **Device Overview** make sure the **Hardware Catalog** is displayed. This can be done by selecting the **Hardware catalog** tab 



60. In the **Hardware catalog** there are two folders to select. Select the **Module** folder to display the Input and Output modules.

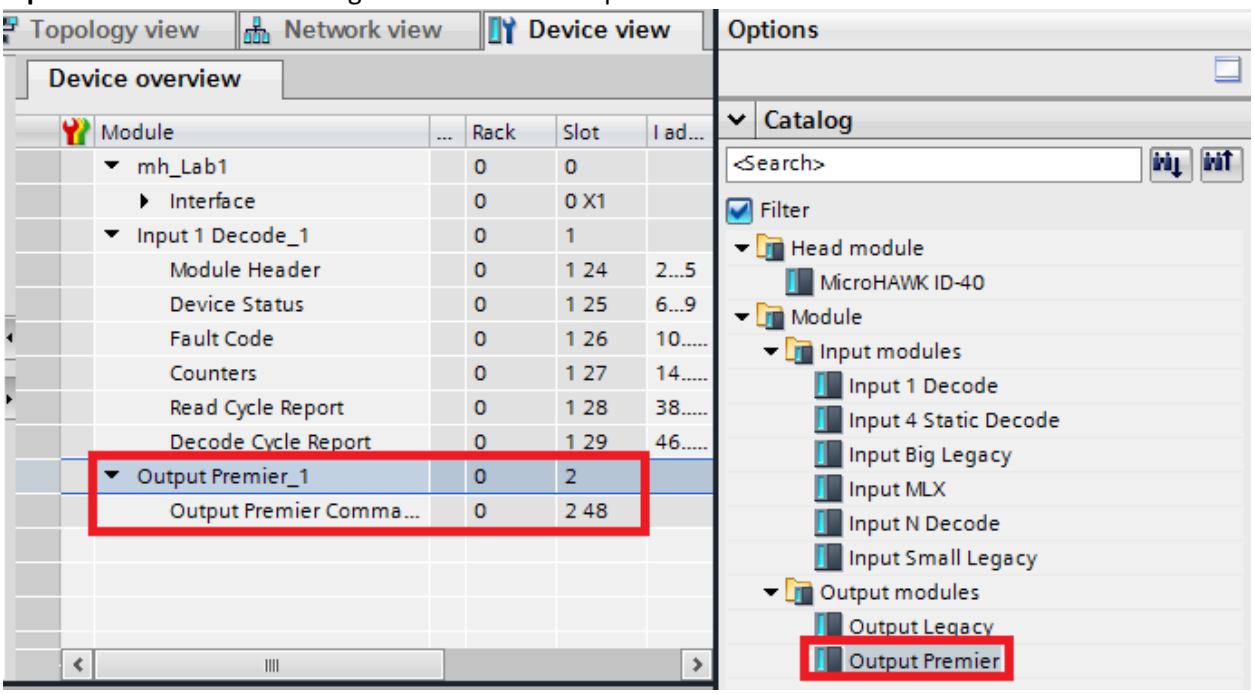


61. To add an input module select the **Input module** folder to display all the possible inputs. Double click the desired **input module** and the module will load into **Slot 1**. In this example **Input 1 Decode** is used.



a. NOTE: **Only one input is allowed.** Please reference Section 3.5 Input Modules for details of each member in the module and the description of each member.

62. To add an output module select the **Output module** folder to display all the possible outputs. Double click the desired **output module** and the module will load into **Slot 2**. In this example **Input 1 Decode** and according to section 3.5.4 Output Premier must be used.



a. NOTE: **Only one output is allowed.** Please reference Section 3.6 Output Modules for details of each member in the module and the description of each member.

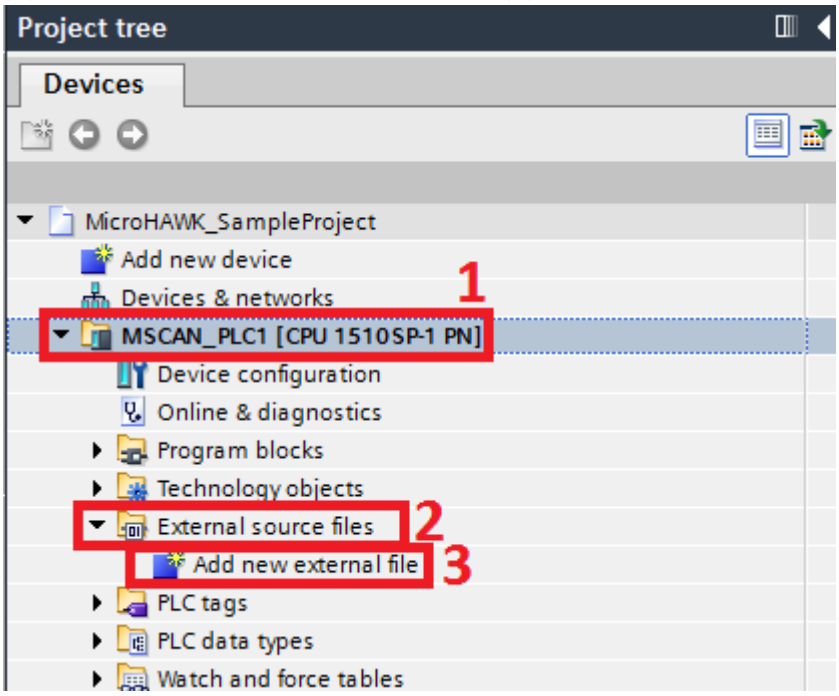
4.8 Importing the PLC Data Types defined by Microscan

63. Before importing the function blocks, the program needs to have user defined PLC data types imported first. These were created to help the user read the tags in a more human readable format. Table 4.8.1 is a list of what User defined types need to be import for the specific Input/Output Module

4.8.1 User Data Types for Input/Output Modules Table

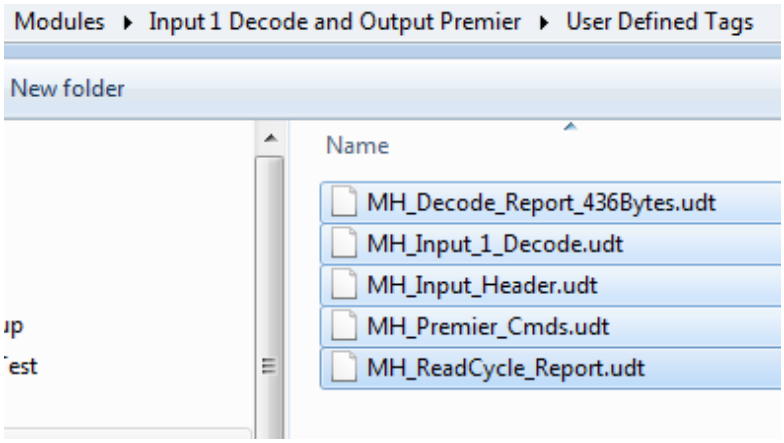
MODULE NAME	USER DATA TYPE NAME
INPUT SMALL LEGACY	• MH_Input_Legacy_Small • MH_Legacy_UserTag_Echo • MH_Legacy_Command_Echo • MH_Legacy_External_Outputs_Echo
INPUT BIG LEGACY	• MH_Input_Legacy_Big • MH_Legacy_UserTag_Echo • MH_Legacy_Command_Echo • MH_Legacy_External_Outputs_Echo • MH_Legacy_Input_Status • MH_Legacy_Ext_Output_Status • MH_Legacy_Device_Status
INPUT MXL	• MH_Input_MXL_Decode • MH_Input_Header • MH_ReadCycle_Report • MH_Input_MXL_Decode_Report
INPUT 1 DECODE	• MH_Input_1_Decode • MH_Input_Header • MH_ ReadCycle_Report • MH_ Decode_Report_436Bytes
INPUT 4 DECODE	• MH_Input_4_Decode • MH_Input_Header • MH_ ReadCycle_Report • MH_ Decode_Report_160Bytes • MH_ Decode_Report_72Bytes
INPUT N DECODE	• MH_Input_N_Decode • MH_Input_N_Header • MH_Input_N_ReadCycle_Report • MH_ Decode_Report_436Bytes
OUTPUT LEGACY	• MH_Ouput_Legacy • MH_Legacy_User_Defined_Tags • MH_Legacy_Cmds • MH_Legacy_External_Outputs
OUTPUT PREMIER	• MH_Premier_Cmds

64. To import the user data types go to the **Project Tree** and select the **Controller Folder (1)**. In this example the Controller folder is **MSCAN_PLC1 [CPU 1510SP-1 PN].** Select **External source file (2)** and double click **Add new external file(3)**.

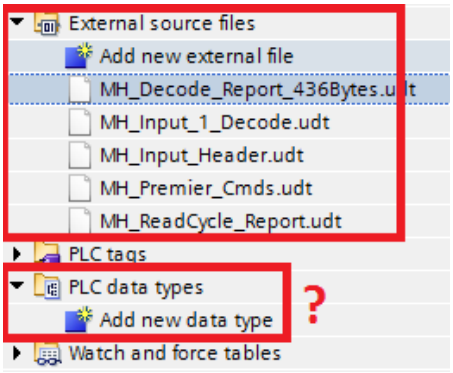


65. When the Open Dialog window displays, navigate to the folder that contains the Input and Output Modules loaded in Section 4.7. In this example the Input 1 Decode Module was added with the corresponding Output Premier Module. Referencing Table 4.8.1 the following User defined tags need to be added:
    a. Input Module
        i. MH_Input_1_Decode
        ii. MH_Input_Header
        iii. MH_ ReadCycle_Report
        iv. MH_ Decode_Report_436Bytes
    b. Output Module
        i. MH_Premier_Cmds

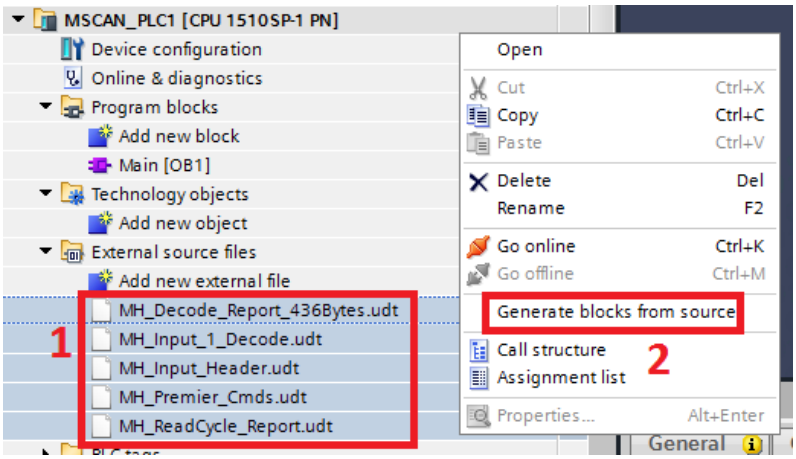
In the zip file downloaded from the Microscan website, navigate to **Modules→Input 1 Decode and Output Premier→User Defined Tag** and select all the files and click **Open**.



66. The files will be added in the External Source File but not added to the PLC Data Types folder.

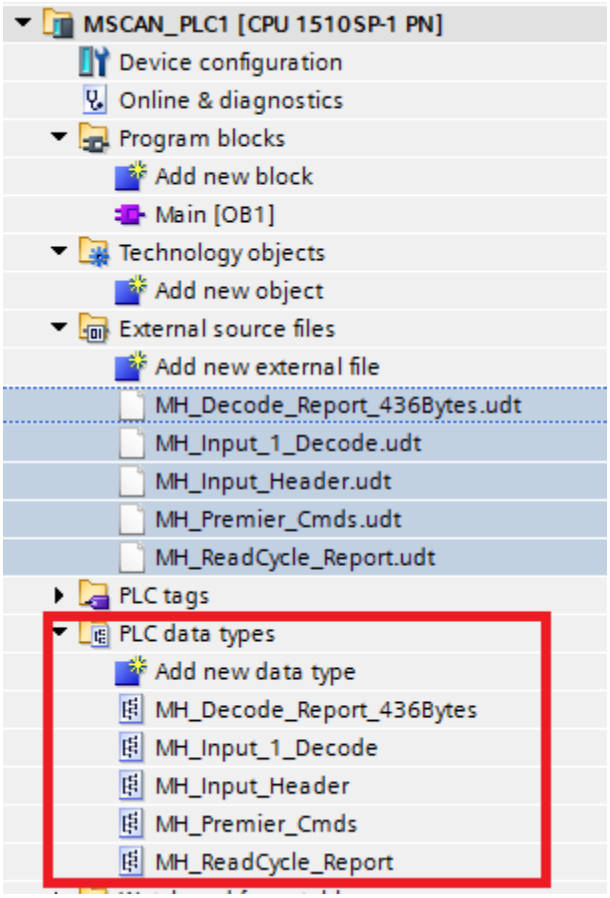


67. To add the external files to the PLC Data Types folder select all the **imported files (1)**, right click the and select **Generate block from Source (2)**

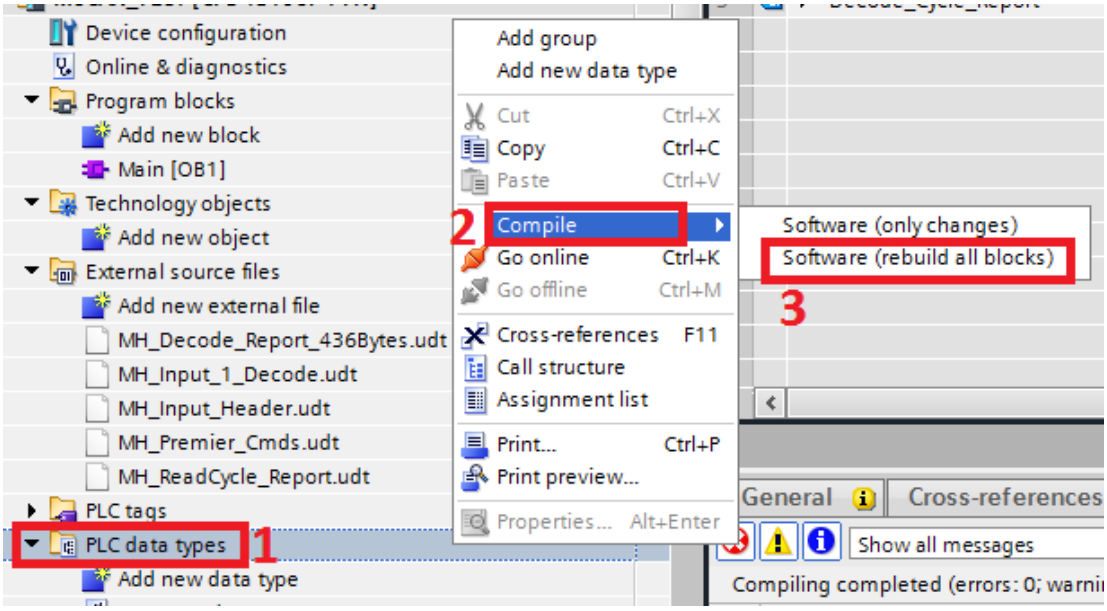


68. A Warning Dialog may display. Click OK to overwrite any existing User data types of the same name.

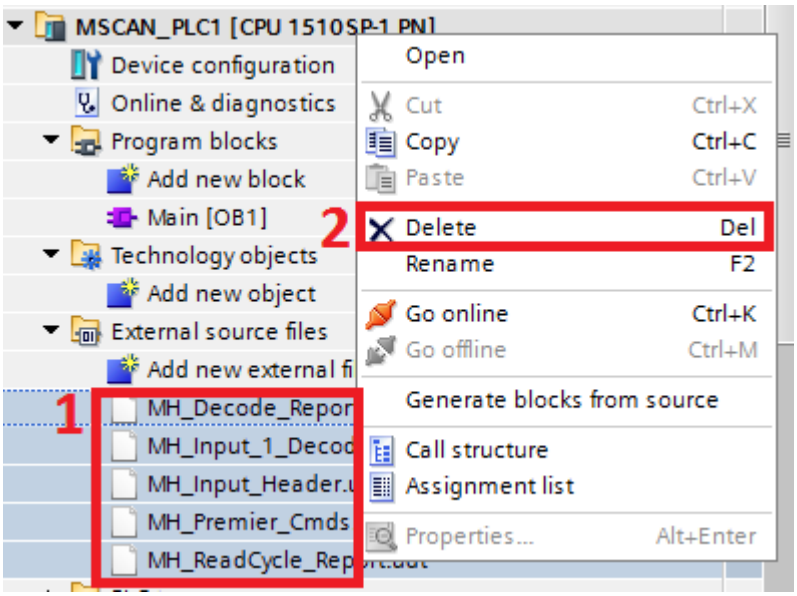
69. All the User data types will now be displayed in the **PLC Data Type** folder in the **Devices** Tab



70. Lastly, the project needs to be recompiled to complete the import of the User Data Types. To do this right click **PLC Data Type (1), select Compile (2)** and select **Software (rebuild all blocks) (3).**

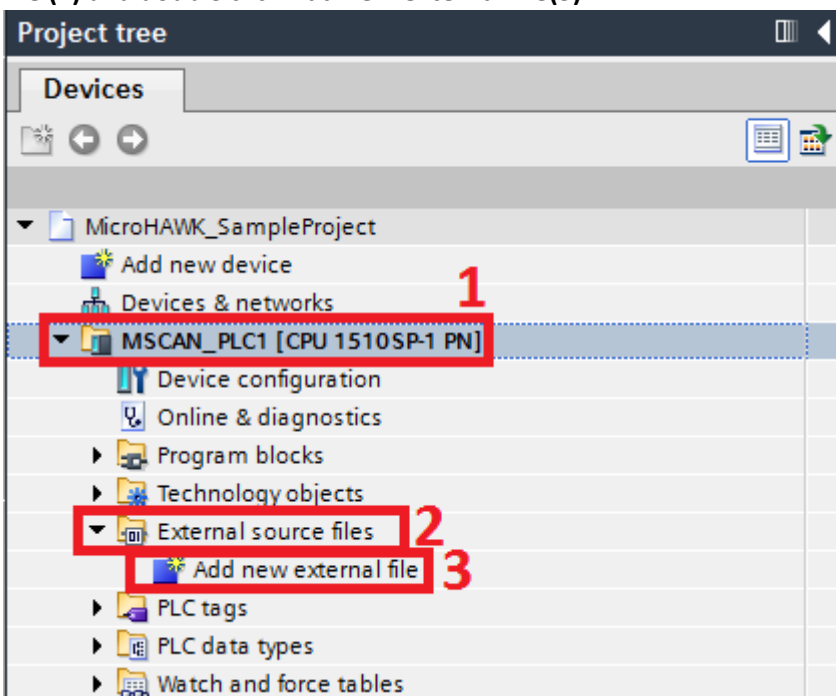


71. The files located in External Source files are no longer needed. To remove them: **select all files (1),** right click and click **Delete (2)**

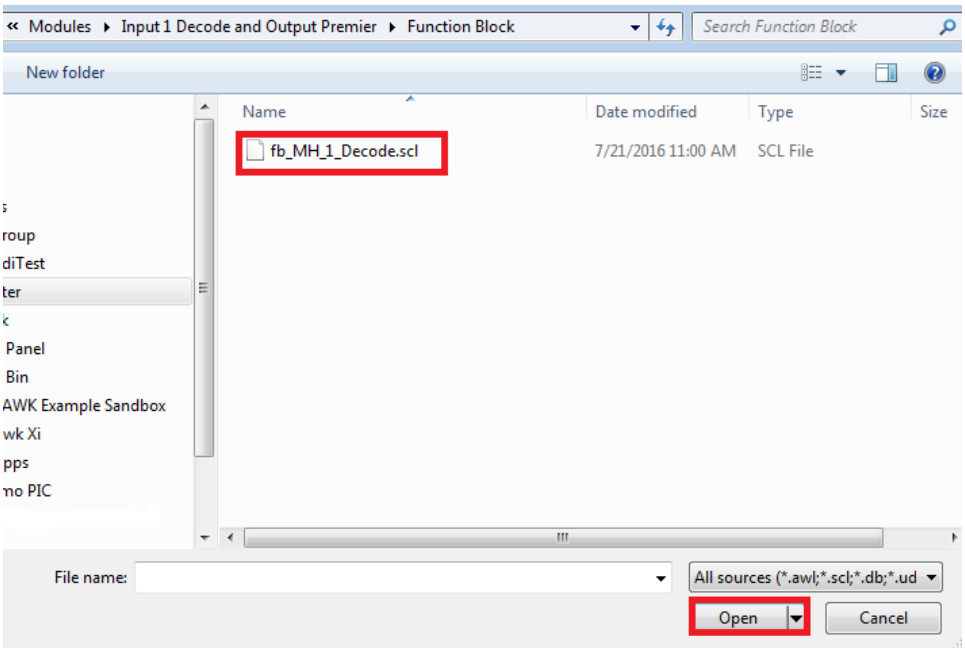


4.9 Importing the Function and Data Blocks created by Microscan

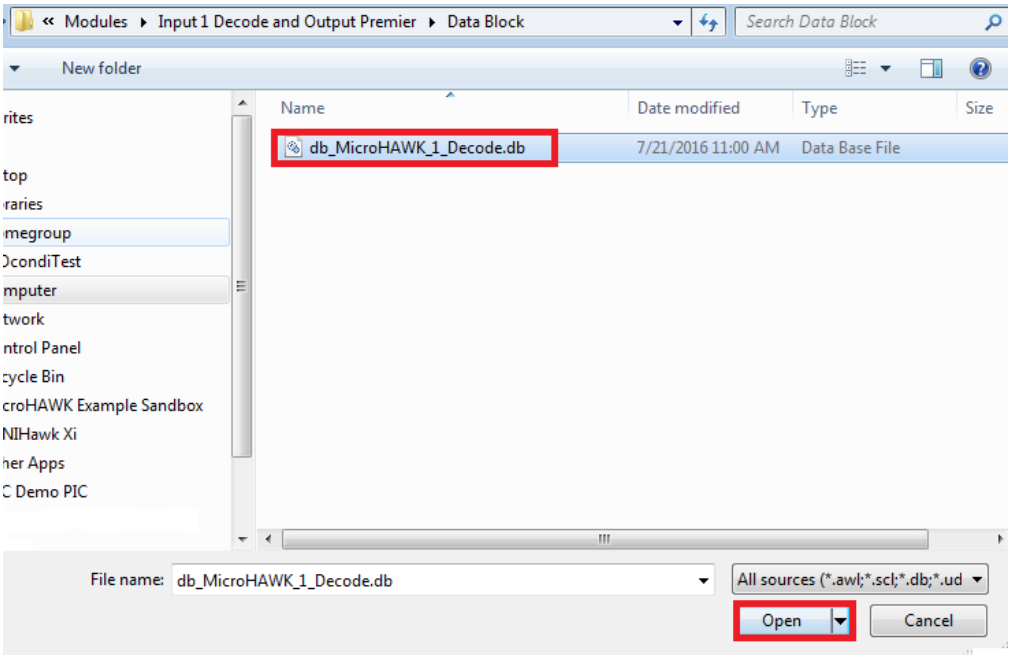
72. After importing the PLC Data Types in Section 4.8, the Function and Data blocks can now be imported. To import both files go to the **Project Tree** and select the **Controller Folder (1)**. In this example the Controller folder is **MSCAN_PLC1 [CPU 1510SP-1 PN].** Select **External source file (2)** and double click **Add new external file(3)**.



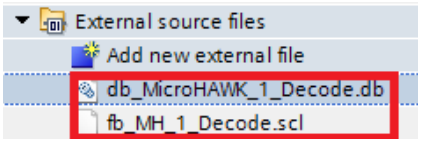
73. When the Open Dialog window displays, navigate to the folder that contains the Input and Output Modules loaded in Section 4.7. In this example the Input 1 Decode Module was added with the corresponding Output Premier Module. In the zip file downloaded from the Microscan website, navigate to **Modules→Input 1 Decode and Output Premier→Function Block** and select **fb_MH_1_Decode.scl** and click **Open**.



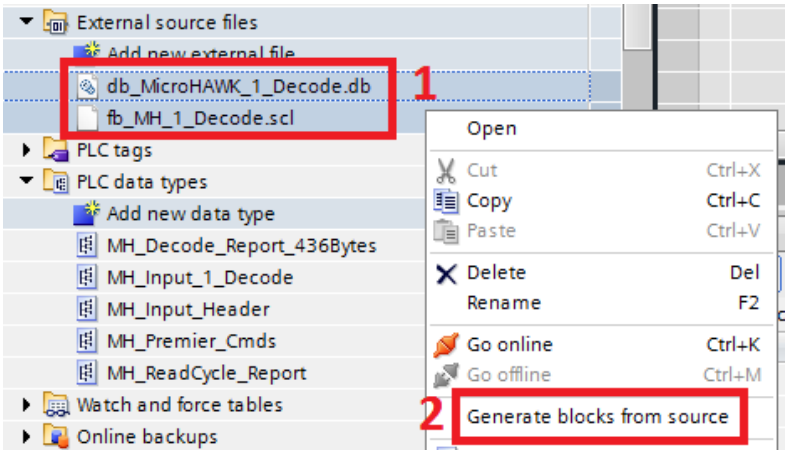
74. Perform the same step as above and navigate to **Modules→Input 1 Decode and Output Premier→Function Block** and select **db_MicroHAWK_1_Decode.db** and click **Open**.



75. Two files should now be shown in **External source files**



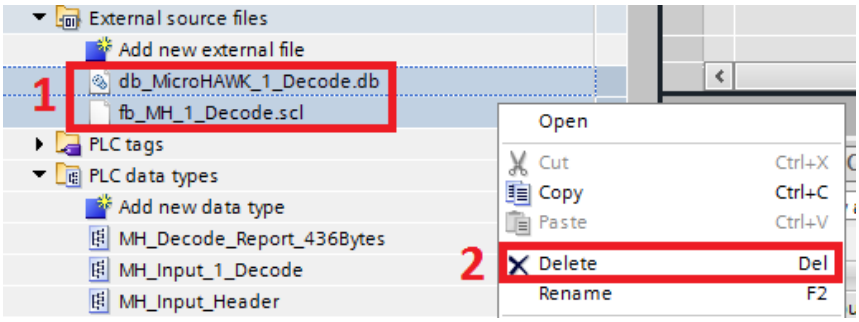
76. Select both **files (1)** right click and select **Generate blocks from source (2)**



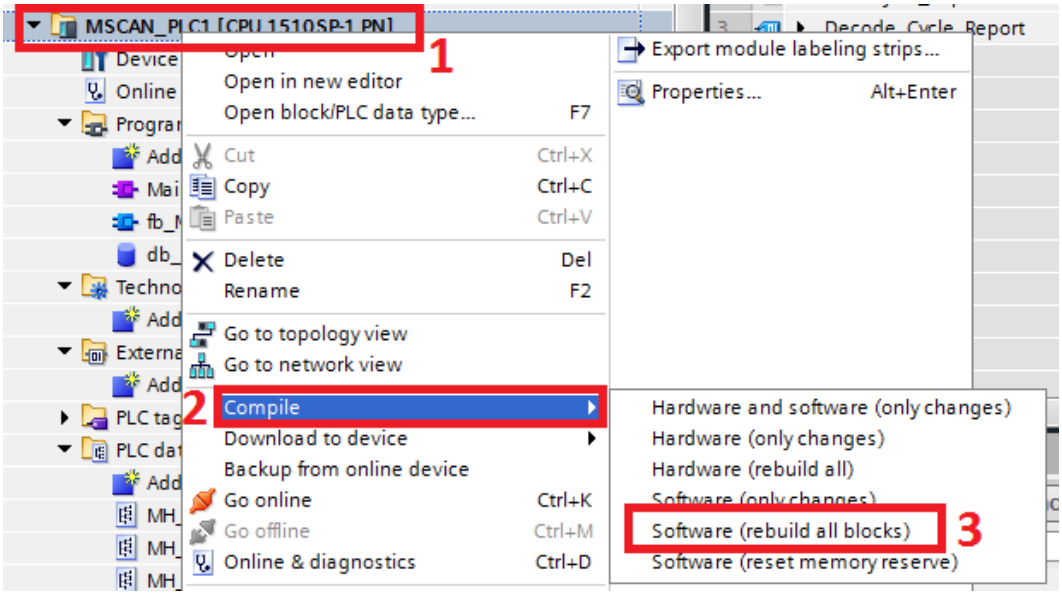
77. A Warning Dialog may display. Click OK to overwrite any existing functions blocks and/or data blocks of the same name.

78. The function block and data block are now added to the Program Block folder

79. The files located in External Source files are no longer needed. To remove them: **select all files (1),** right click and click **Delete (2)**

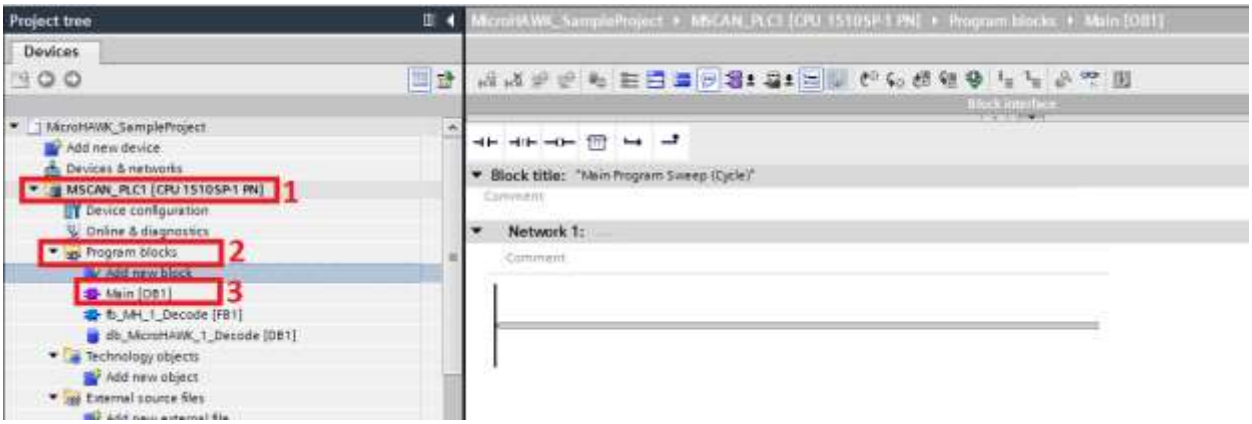


80. Right Click the **Controller Folder (1)** and select **Compile (1) → Software (rebuild all blocks) (2)**

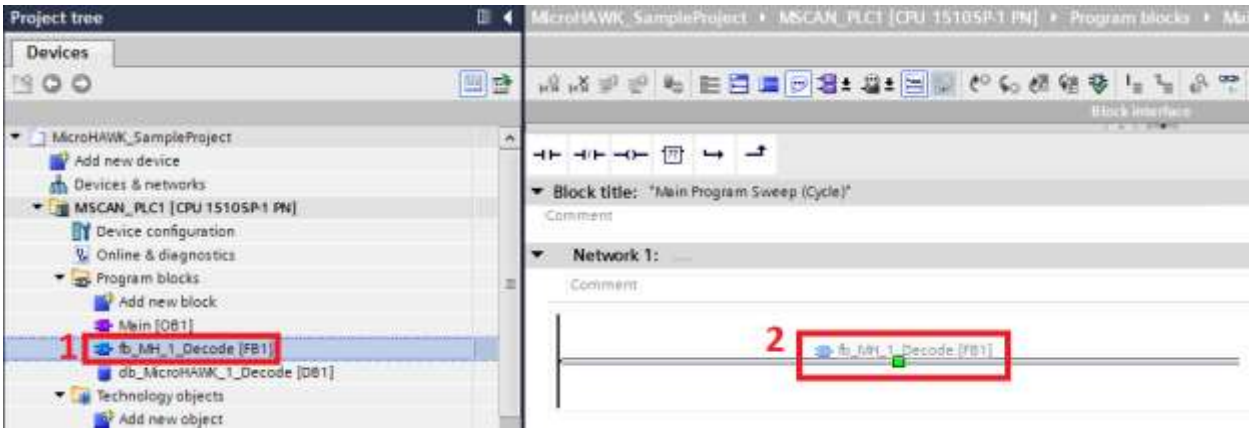


4.10 Adding a Function Block to an Organization Block

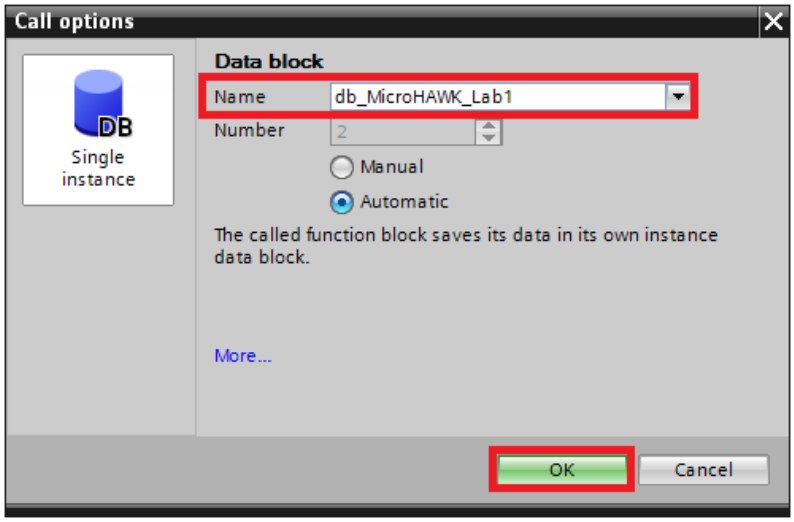
81. To use the function block imported in Section 4.9 to an Organization Block in the project go to the Device Tab click on **Controller Folder (1),** select **Program Blocks(2)** and double click on the **Organization Block (3)** in which the function block will execute. In this example we have an Organization Block called Main and will insert the function block here.



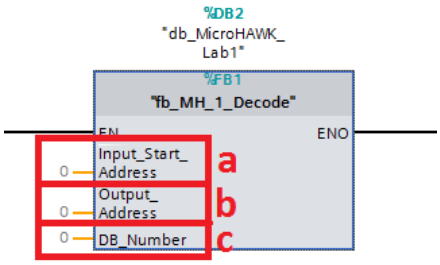
82. Select the **function block (1)** added from Step 78 in Section 4.9. Drag and drop the function block into the rung in which the **program (2)** will execute. In this example, Network 1 is the rung that will execute the read/write function.



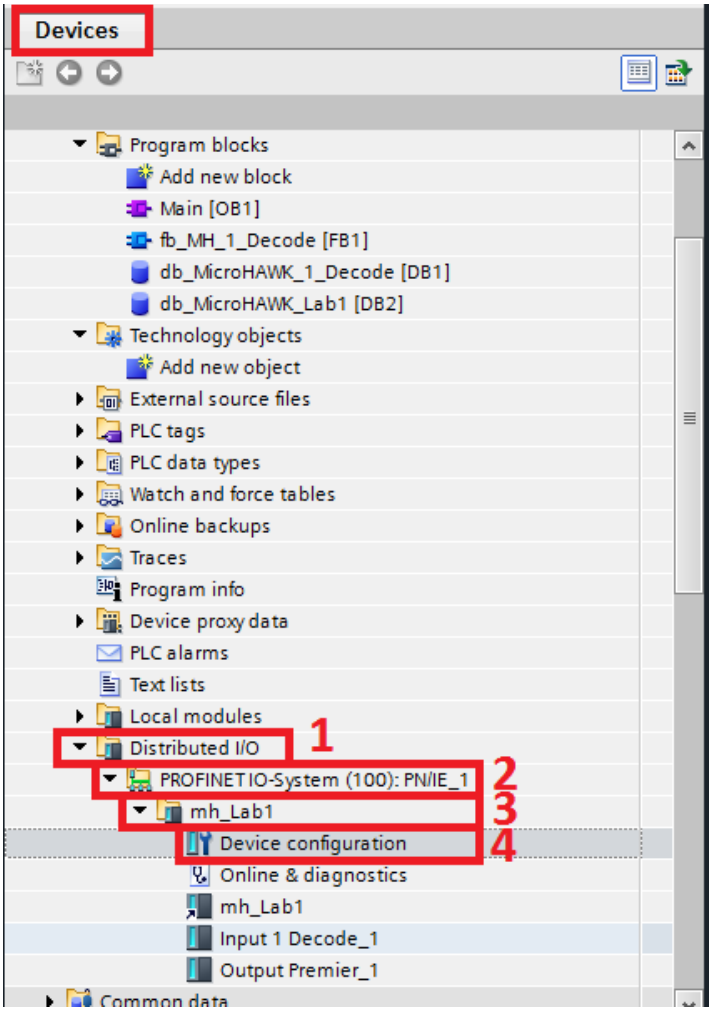
83. When the **Call options** dialog displays, name the data block instance to a desired name. In this example the data block is named **db_MicroHAWK_Lab1**. Click OK to add the data block instance.



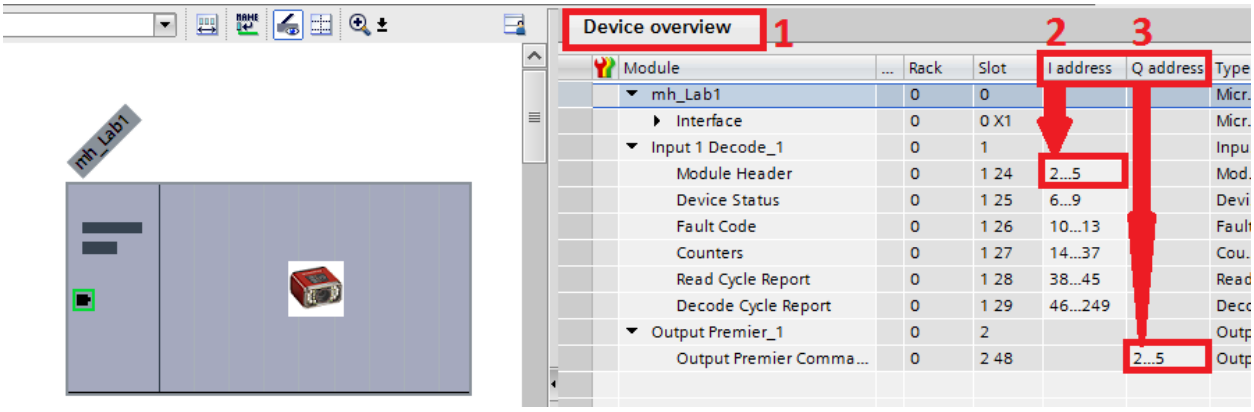
84. The function block is now added to the rung. All function blocks for the MicroHAWK require the following inputs
    a. MicroHAWK Input Start Address
    b. MicroHAWK Output Start Address
    c. MicroHAWK Data Block Number that data is written and read from



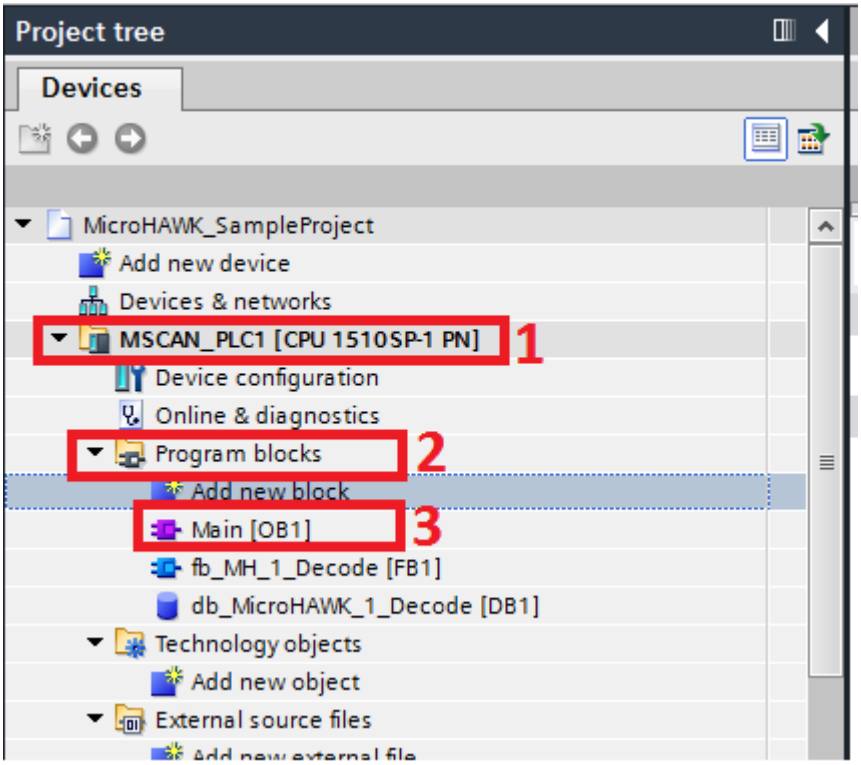
85. To locate the Input Start Address, Output Start Address go to the **Device** Tab and go to **Distributed I/O (1)→PROFINET IO- System(100): PN/IE_1 (2)→ Name of Device (3)** and double click **Device configuration (4).** In this example Name of Device is **"mh_Lab1"**



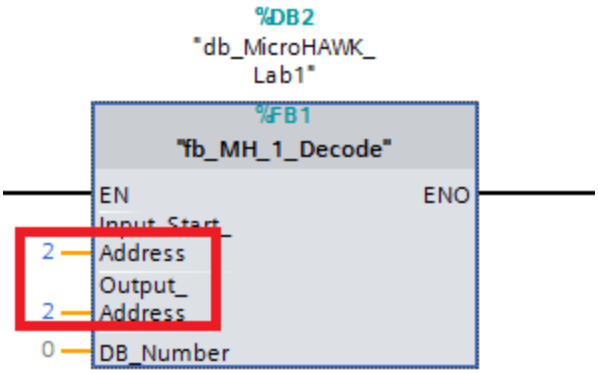
86. In the **Device Overview (1)** tab locate the **I address (2)** and **Q Address (3)** columns. Write down the start address for the Input and Output Module. In this example the Input address starts at 2 and the Output address starts at 2.



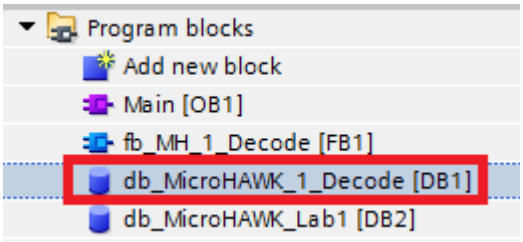
87. Go back to the **Device** Tab click on **Controller Folder (1),** select **Program Blocks(2)** and double click on the **Organization Block (3)** in which the function block was added.



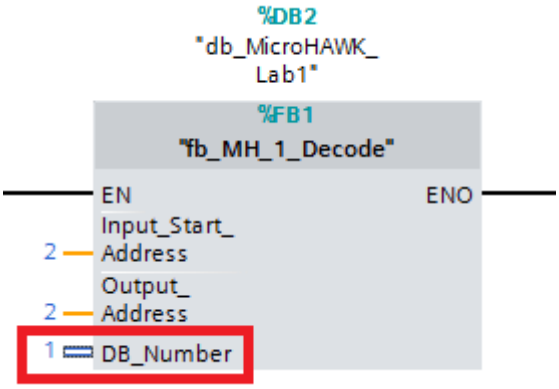
88. In the function block add the **Input Start Address** and **Output Start Address** that were located in step 86. In this example, step 86 showed the Input and Output starting at address 2



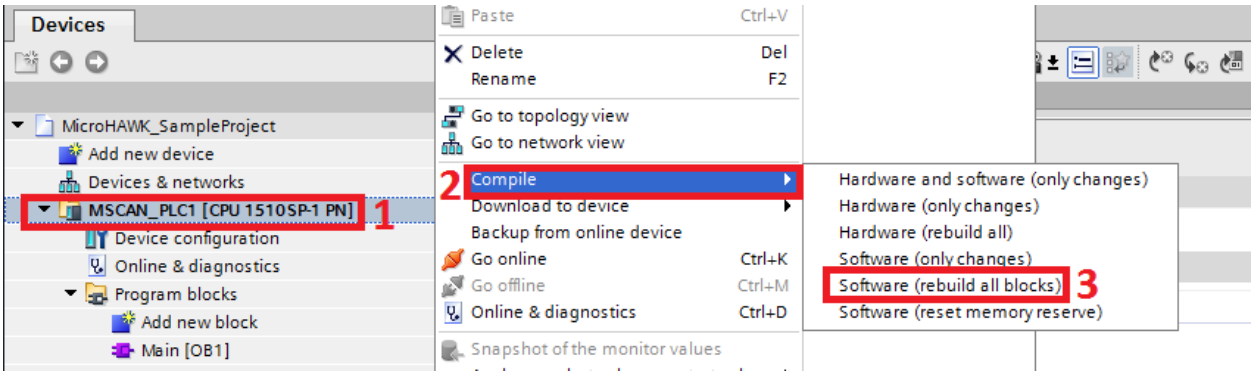
89. The DB_Number is the data block created in step 78 in Section 4.9. The number is either automatically created or manually inputted by the programmer and can be found by looking at the [DB#] to the right of the name. In this example the data block number is 1 ([DB1])



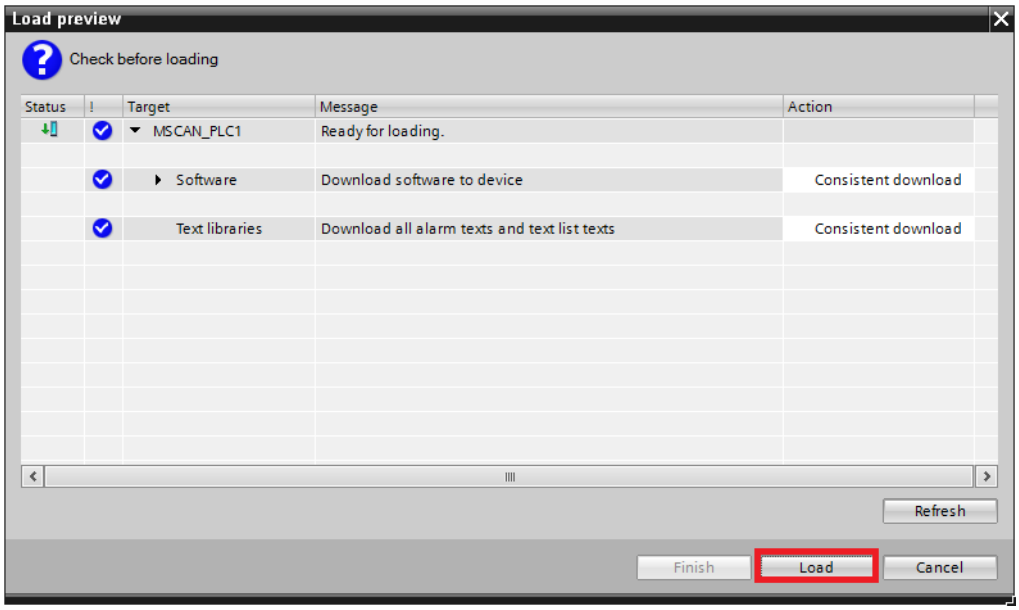
90. Enter the DB_Number in the function block



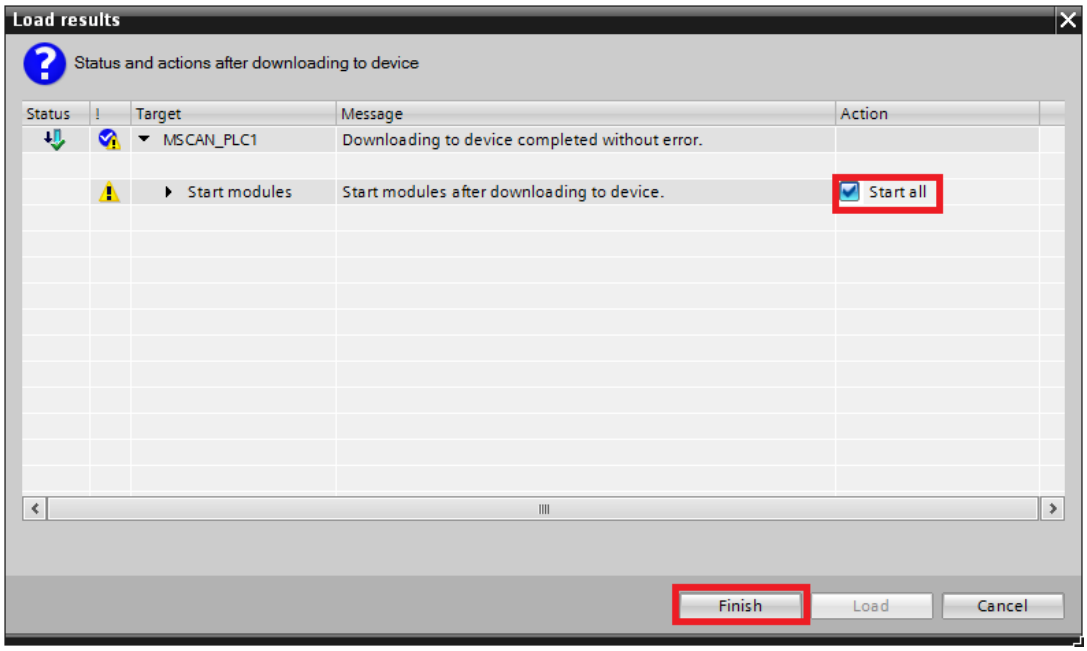
91. Right Click the **controller folder (1)** and select **Compile (2)** → **Software (rebuild all blocks) (3)**

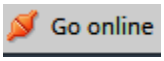


92. Download the project to the controller by selecting the **Download** icon and clicking the **Load** button when the **Load preview** dialog displays.

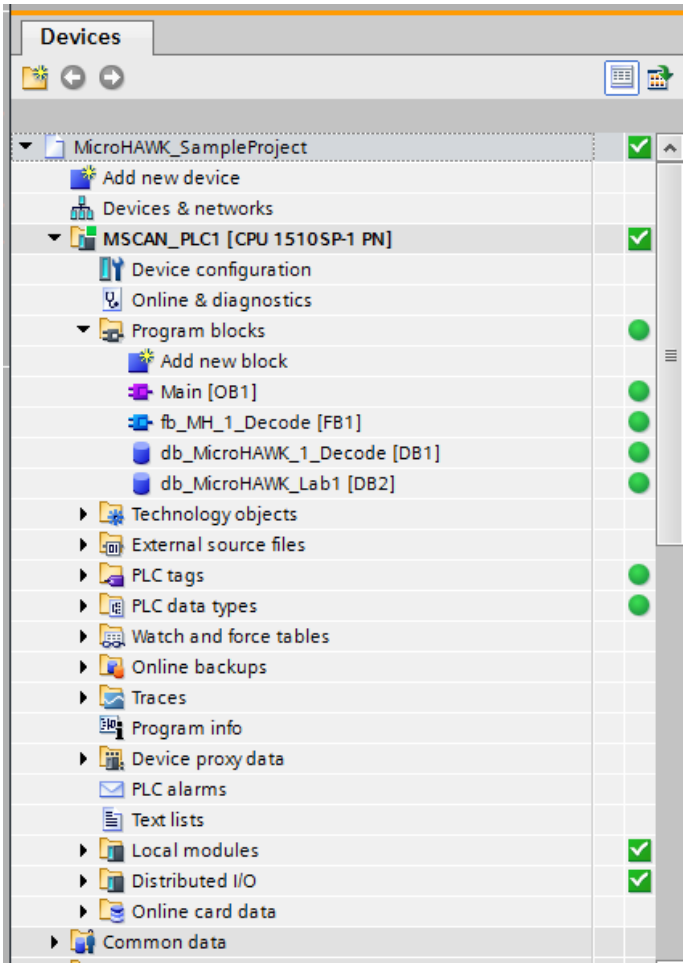


93. When the **Load results** dialog displays, check the box **Start all** and click **Finish**

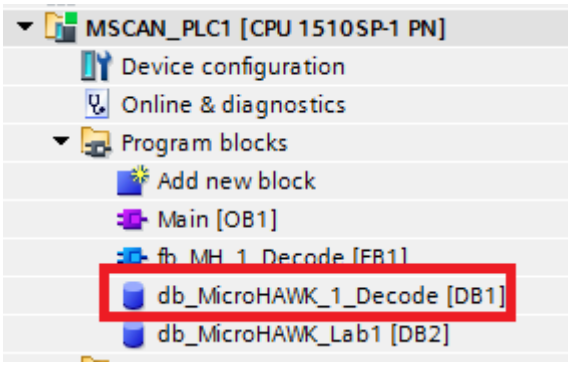


94. To verify that the Controller and the MicroHAWK are communicating click the **Go Online** icon 

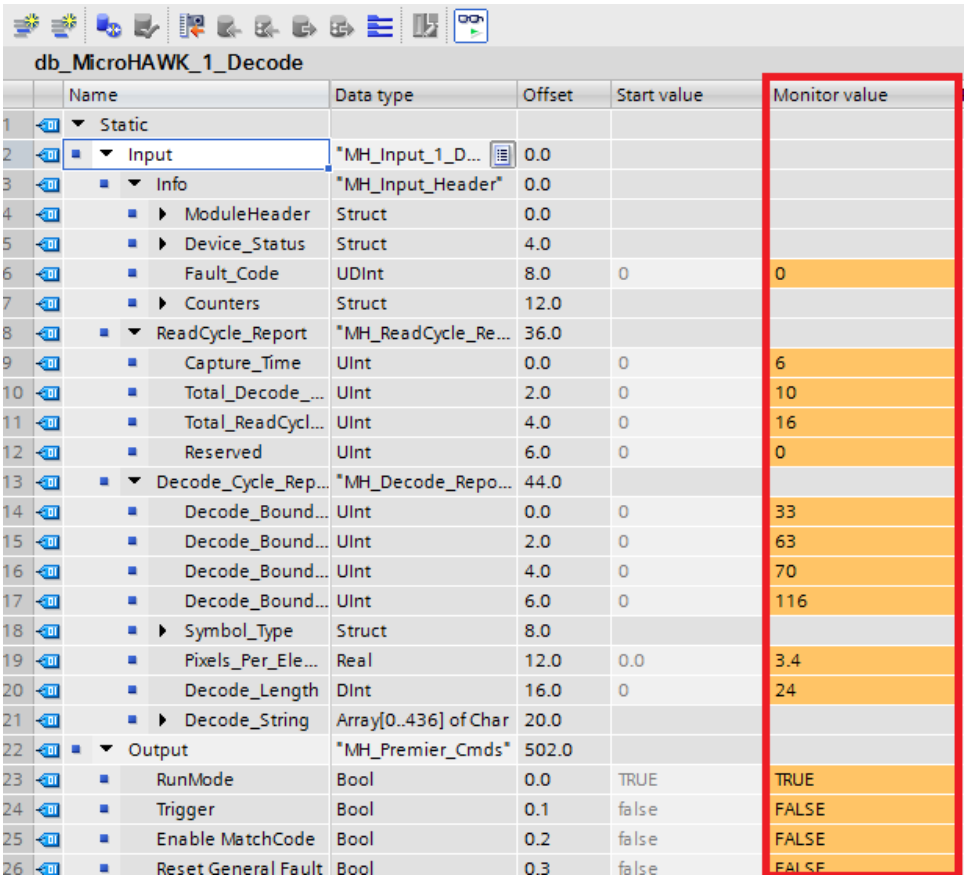
. The Devices tab will display green indicators showing that the controller's is in Run Mode and everything is working correctly. If any errors occur it is the programmer's responsibility to address them before proceeding.



95. Double click on the data block assigned to the function block. This is where the data is being passed from the Controller to the MicroHAWK. In this example the data block is called db_MicroHAWK_1_Decode.



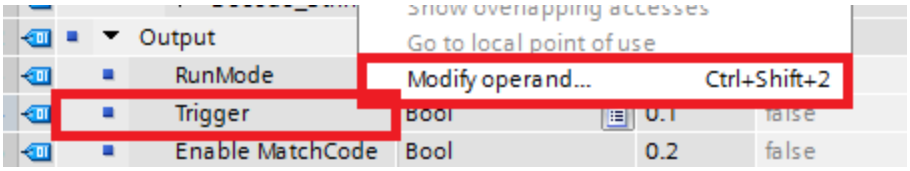
96. The data block viewer will display the contents of the Input and Output Modules. Click the **Monitor All**  icon to view the data in the Monitor value column



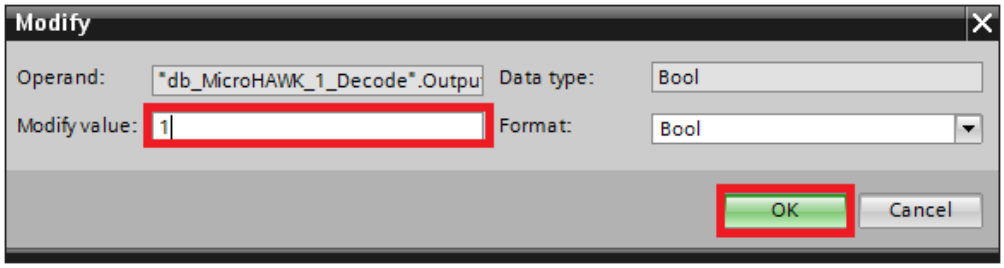
db_MicroHAWK_1_Decode

	Name	Data type	Offset	Start value	Monitor value
1	Static				
2	Input	"MH_Input_1_D...	0.0		
3	Info	"MH_Input_Header"	0.0		
4	ModuleHeader	Struct	0.0		
5	Device_Status	Struct	4.0		
6	Fault_Code	UDInt	8.0	0	0
7	Counters	Struct	12.0		
8	ReadCycle_Report	"MH_ReadCycle_Re...	36.0		
9	Capture_Time	UInt	0.0	0	6
10	Total_Decode_...	UInt	2.0	0	10
11	Total_ReadCycl...	UInt	4.0	0	16
12	Reserved	UInt	6.0	0	0
13	Decode_Cycle_Rep...	"MH_Decode_Repo...	44.0		
14	Decode_Bound...	UInt	0.0	0	33
15	Decode_Bound...	UInt	2.0	0	63
16	Decode_Bound...	UInt	4.0	0	70
17	Decode_Bound...	UInt	6.0	0	116
18	Symbol_Type	Struct	8.0		
19	Pixels_Per_Ele...	Real	12.0	0.0	3.4
20	Decode_Length	DInt	16.0	0	24
21	Decode_String	Array[0..436] of Char	20.0		
22	Output	"MH_Premier_Cmds"	502.0		
23	RunMode	Bool	0.0	TRUE	TRUE
24	Trigger	Bool	0.1	false	FALSE
25	Enable MatchCode	Bool	0.2	false	FALSE
26	Reset General Fault	Bool	0.3	false	FALSE

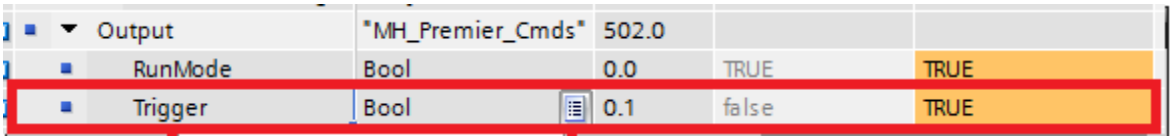
97. To trigger the unit simply right Click the Output bit **Trigger** and select **Modify operand…**



98. In Modify Value type 1 and select OK.



99. The value will change from FALSE to TRUE



Output	"MH_Premier_Cmds"	502.0		
RunMode	Bool	0.0	TRUE	TRUE
Trigger	Bool	0.1	false	TRUE

100. The decode string will populate with the decode data

Decode_String	Array[0..436] of Char	20.0		
Decode_Stri...	Char	0.0	' '	'h'
Decode_Stri...	Char	1.0	' '	't'
Decode_Stri...	Char	2.0	' '	't'
Decode_Stri...	Char	3.0	' '	'p'
Decode_Stri...	Char	4.0	' '	':'
Decode_Stri...	Char	5.0	' '	'/'
Decode_Stri...	Char	6.0	' '	'/'
Decode_Stri...	Char	7.0	' '	'w'
Decode_Stri...	Char	8.0	' '	'w'
Decode_Stri...	Char	9.0	' '	'w'
Decode_Stri...	Char	10.0	' '	'.'
Decode_Stri...	Char	11.0	' '	'm'
Decode_Stri...	Char	12.0	' '	'i'
Decode_Stri...	Char	13.0	' '	'c'
Decode_Stri...	Char	14.0	' '	'r'
Decode_Stri...	Char	15.0	' '	'o'
Decode_Stri...	Char	16.0	' '	's'
Decode_Stri...	Char	17.0	' '	'c'
Decode_Stri...	Char	18.0	' '	'a'
Decode_Stri...	Char	19.0	' '	'n'
Decode_Stri...	Char	20.0	' '	'.'
Decode_Stri...	Char	21.0	' '	'c'
Decode_Stri...	Char	22.0	' '	'o'
Decode_Stri...	Char	23.0	' '	'm'